

# NETWORK WORLD

The Newsweekly of Enterprise Network Strategies

Volume 9, Number 45

An International Data Group Publication

November 9, 1992

## Oracle glues desktops to net services

By Timothy O'Brien  
West Coast Bureau Chief

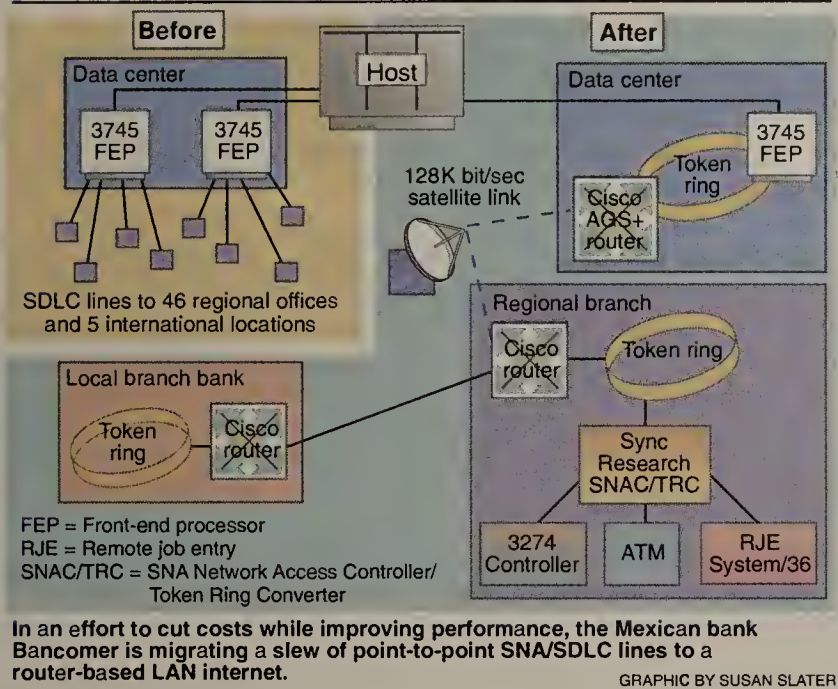
REDWOOD SHORES, Calif. — With the introduction last week of a high-level application program interface (API) for desktop applications, Oracle Corp. revealed another piece of its strategy to broaden its scope beyond its traditional database focus.

The new API, called Oracle Glue, will allow developers of Windows-based applications, such as spreadsheets and query tools, to provide products that can access a variety of back-end database servers, such as mail servers and file servers.

In addition, it may be possible next year to use Oracle Glue with a non-database-dependent version of Oracle's SQL\*Net communications software — which is expected to be announced at that time — to support applications running transparently in multiplatform, multiprotocol network environments.

The powerful combination of these products could enable Oracle to provide users with the protocol, operating system and  
(continued on page 5)

## Bank invests in routers for SNA net overhaul



## Bank buys into Cisco plan for handling SNA traffic

By Maureen Molloy  
Senior Writer

MEXICO CITY — Having recently moved from the public to the private sector, Mexico's second largest commercial bank is now eyeing the bottom line more closely.

One change prompted by this new fiscal concern is the planned migration of the bank's SNA net to a local-area network-based internet that is expected to lower

costs and support enhanced banking services.

Bancomer last week signed a multimillion-dollar contract to purchase more than 1,000 Cisco Systems, Inc. AGS+ and MGS routers. It will use the equipment to construct an enterprisewide internet that will link more than 700 remote sites throughout Mexico, the U.S. and the Caribbean, as well as in London, to the  
(continued on page 62)

## AT&T bid for McCaw to reshape landscape

Gives dominant carrier access to rapidly evolving market and opportunity to influence, drive change.

By Bob Brown and Bob Wallace  
Network World Staff

NEW YORK — AT&T last week said it plans to buy a 33% stake in cellular telephone giant McCaw Cellular Communications, Inc., a move that would catapult AT&T to the forefront of wireless services and put it in competition with its former Bell company units.

The \$3.7 billion deal, which should be finalized by mid-1993, would not only give AT&T a leg up on its long-haul rivals in the changing wireless market, but also have implications for the local loop.

The alliance would thrust AT&T into competition with the Bell operating companies' cellular subsidiaries and, some observers say, potentially result in a new way to bypass the BOCs. Ultimately, it could put pressure on regulators to let the BOCs into the long-haul market.

Short term, however, the deal would enable the companies to focus on advancing wireless technology to support a new age of

mobile office workers.

"I fully share McCaw's vision of personal communications networks that can put intelligent communications [devices] into everyone's hip pocket," said Robert Allen, chairman and chief ex-  
(continued on page 5)

### FEATURES

■ Buyer's Guide helps users size up switched digital services. Page 39.



### NETLINE



**CINCOM SETS SIGHTS** on LAN market with new relational DBMS. Page 2.

**FEDERAL RESERVE STARTS** trek toward OSI implementation. Page 2.

**VENDOR GROUP FUNDS** development of advanced customer support system. Page 2.

**UB OFFERS** bus master card for

ISA micros, teams with Chips and Technologies. Page 4.

**SYBASE TOOLS TO HELP** users build and control client/server environments. Page 4.

**FCC SAYS IT WON'T** require nondominant long-distance carriers to file tariffs. Page 4.

**SYNOPTICS ROUNDS OUT** token-ring interface line. Page 4.

## Carriers plot strategies at dawn of war over 800 users

By Anita Taff  
Washington Bureau Chief

WASHINGTON, D.C. — Long-distance carriers last week fired the first shots in what is shaping up to be a fierce battle for customers of 800 service as the scheduled date for 800 portability approaches.

The carriers' strategy, it seems, is to throw a safety net over existing customers while trying to capture as many 800 customers from rivals as possible.

Last week, MCI Communications Corp. won the first skirmish in the battle. National Westminster Bancorp (NatWest) signed an agreement to move its prized (800) NAT-WEST number and

millions of dollars of traffic from AT&T to MCI as soon as portability is available.

Looking to safeguard another itchy account, AT&T tried to lock in PaineWebber, Inc., a major Tariff 12 customer, by offering the company a \$100,000 credit in exchange for a promise not to change carriers after portability.

Sprint has been less public in its efforts to snare 800 customers, but Gerry Euston, Sprint's vice-president of business product marketing, promises the carrier will come on strong. He declined to discuss the specifics of any marketing program but said Sprint will offer customers financial incentives, free features and  
(continued on page 61)

## IEEE to weigh fast Ethernet alternatives

By Network World staff

SAN DIEGO — Leading Ethernet vendors, including 3Com Corp., Hewlett-Packard Co. and SynOptics Communications, Inc., will offer up 100M bit/sec Ethernet plans this week at an IEEE 802.3 committee meeting here in hopes of forming a standard for this emerging technology.

The movement to the souped-up Ethernet has been gaining momentum since Grand Junction Networks, Inc. announced Fast Ethernet, its version of 100M bit/sec Ethernet that runs over unshielded twisted-pair cabling ("Start-up targets FDDI speeds for Ethernet," NW, Oct. 5).

(continued on page 6)



# Cincom makes run for LAN market with SQL database

High-performance Supra Server runs on Unix, OS/2, Windows NT and proprietary systems.

By Wayne Eckerson  
Senior Editor

CINCINNATI — Touting its expertise in mainframe databases, Cincom Systems, Inc. last week pushed into the LAN market by announcing a new SQL relational database that runs on Unix, OS/2, Windows NT and proprietary host operating systems.

Cincom's Supra Server combines a flexible architecture with the capacity to handle high-volume transaction processing applications that are typically done on proprietary host systems.

"We are the only database vendor that offers a high-perfor-

mance system that can reliably run across host, Unix and LAN environments," said Tom Hammergren, director of marketing at Cincom, based here. But the company will be going head-to-head against cross-platform suppliers such as the giant Oracle Corp. and other local-area network/Unix players such as Sybase, Inc.

Cincom plans to grab 10% of the Unix database market by 1996, Hammergren said. The company currently has almost 2,000 customers worldwide that use its proprietary IBM MVS and Digital Equipment Corp. VAX  
(continued on page 63)

# Federal Reserve commits to nationwide OSI network

Banks across U.S. could be moved to follow suit.

By Michael Cooney  
Senior Editor

SAN FRANCISCO — The Federal Reserve System has embarked on a long-term project aimed at employing OSI protocols as the foundation for its nationwide FedNet funds transfer network, a move that could spur OSI usage among banks nationwide.

Ultimately, the Federal Reserve intends to require its 12 member banks and more than 1,500 other financial institutions to use Open Systems Interconnection protocols — such as File Transfer, Access and Manage-

ment (FTAM) and X.400 — when communicating with the central Federal Reserve bank, based here.

Disclosure of the Federal Reserve's plan comes on the heels of similar news that Citibank, N.A., one of the nation's largest commercial banks, is moving to an OSI-based net for its monetary transactions ("Citibank commits to OSI with global X.400 net plan," NW, Oct. 26).

The Federal Reserve said its OSI-based FedNet network would handle transaction-oriented communications such as funds  
(continued on page 6)

# Vendors team up to build service, support system

By Bob Brown  
Senior Editor

REDMOND, Wash. — A host of vendors last week announced they have agreed to share the cost of developing an advanced customer support system they can use to improve customer service.

Teaming as a group called the Customer Support Consortium, the vendors will fund development of a so-called knowledge management system by software developer Symbolic Corp.

Once installed by forum members, the product will speed problem resolution by enabling customer support staffers at both

vendor and user organizations to access multiple support systems from a single client workstation.

The group will initially comprise 19 members, including Banyan Systems, Inc., Digital Communications Associates, Inc., Hewlett-Packard Co., Intel Corp., NCR Corp., Sybase, Inc. and US West Communications, Inc. (see graphic, page 6).

Symbolic, which will manage the consortium, is building the system to specifications identified in a survey of members' customer support needs, said Craig Chelius, director of sales  
(continued on page 6)

## Briefs

**DEC readies Alpha rollout.** Digital Equipment Corp. is scheduled this week to unveil offerings for its Advantage Networks line, formerly called DECnet Phase V. Although DEC declined to comment, sources expect the company to introduce new Alpha-ready implementations of DECnet and OpenVMS software, in addition to new Alpha-based workstations and three Alpha-based servers. Alpha, the firm's new Reduced Instruction Set Computing chip, boasts peak processing power of 400 million instructions per second.

Last week, DEC began shipping DECnet/OSI for VMS Version 5.5, five months after it was originally scheduled to ship and 1½ years after the Ultrix version was released. DEC said the delay was due to user requests for more functionality, such as a local naming service, and subsequent testing of those new features.

**MCI launches promo for 800 users.** MCI Communications Corp. last week detailed MCI 800Investor, a promotion that gives new MCI 800 users a sign-up discount ranging from 5% for those signing one-year deals to 15% for users with three-year contracts. It also offers a discount on annual usage ranging from 2% to 4%, depending on contract length, plus credits of up to \$6,400 per six-month period to users of MCI Vision's outbound calling capabilities. The promotion will run through mid-February.

**Client/server CASE.** Andersen Consulting and Hewlett-Packard Co. last week announced a strategic partnership to develop computer-aided software engineering (CASE) tools for building Unix-based client/server applications. The two companies will extend Andersen's Foundation CASE product to develop client/server applications that run on HP 9000 Series 800 Unix servers and Unix client workstations under the Motif graphical user interface. The companies also plan to develop a Foundation repository that runs on HP 9000 servers. Initial products are expected by the second half of next year.

**Howdy pardner!** Unix System Laboratories, Inc. last week said it selected a handful of vendors to provide applications that will run on top of its object-oriented Distributed Management (DM) framework, which was developed by Tivoli Systems, Inc. The vendors include Tivoli, for a host agent application; Gradient Technologies, Inc., for license management; Unisys Corp., for software installation and distribution; Siemens Nixdorf Informationsysteme AG, for print spooling and management; and Pyramid Technology, Inc., for storage device management. DM is slated for beta-testing by the second half of 1993.

**ANSI puts standards on CD.** The American National Standards Institute last week began making available all published ANSI standards on CDROM, with index and cross-reference features allowing users to locate information quickly via computer. For more information, call ANSI's customer service department at (212) 642-4900.

**CDPD readies hard cell.** At next week's Comdex/Fall show in Las Vegas, the Cellular Digital Packet Data (CDPD) consortium will demonstrate the technology to be used on its emerging national cellular data network. CDPD is a technology being backed by IBM, McCaw Cellular Communications, Inc. and a host of regional cellular carriers. The demonstrations will feature several personal communicator devices working with the cellular data system, but a McCaw spokesman refused to identify whose devices will be shown.

## CONTENTS

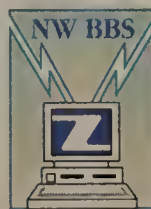
<b>Data Net Architectures</b>	<b>9</b>
Telematics rolls out its frame relay line.	
Newbridge buys into ACC's internetworking strength.	
<b>Local Networking</b>	<b>17</b>
New offering forges mobile connections.	
Number of PC, Mac virus attacks expected to decline.	
<b>Internetworks</b>	<b>21</b>
NSC/Vitalink unveils upgrades to 6600.	
DEC enhances connectivity options to non-DEC nets.	
<b>Global Services</b>	<b>25</b>
Long-distance SMDS trial proves positive.	
AT&T on the defensive in private-line billing dispute.	
<b>Enterprise Applications</b>	<b>27</b>
Powersoft commits to open client/server.	
SunSoft extends ToolTalk to five new Unix systems.	
<b>Industry Update</b>	<b>29</b>
FCC asks users for dialing system input.	
RAM Mobile offers E-mail on its wireless network.	
<b>Management Strategies</b>	<b>31</b>
Help desk frees up veteran IS staffers.	
HDI forms 100-member research, support group.	
<b>Opinions</b>	<b>36</b>
<b>Features</b>	<b>39</b>
<b>Action Center</b>	<b>51</b>
<b>Networking Marketplace</b>	<b>58</b>
<b>Networking Careers</b>	<b>60</b>

## CONTACTS



### We want to hear from you.

Network World has set up a toll-free number you can use to leave news tips or letters to the editor. Let us know what's going on or how you feel about the stories you read in our publication by calling (800) 622-1108, Ext. 487.



**NW Bulletin Board System.** Contact us electronically. Our

BBS lets you submit letters to the editor, pass on tips, leave change of address requests, interact with other readers, down-

load free software and hunt for jobs. You can use your IBM, Apple or other microcomputer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing (508) 620-1160

or at speeds up to 9.6K bit/sec by dialing (508) 620-1178.

## REPRINTS

Article and chart reprints (minimum 500 copies) can be ordered from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172; (508) 875-6400.

Back issues (\$5 per issue) can be ordered from Bobbie Cruise by calling (800) 622-1108.



# 5 problems. 800 solutions.

Nobody offers you more 800 service than Sprint. Nobody.

- Let's say your operation has locations in different area codes. So servicing your customers on a local basis is a real problem.

Thanks to Sprint's Area Code Routing, every 800 call automatically goes to your location in the customer's area code. Or your nearest available location to the customer's area code.

Which means customers get more customer service. And less lip service.

- Maybe you've got a different problem. Maybe you need 800 service that routes your calls to different locations. Depending on time of day.

Enter Sprint's Time of Day Routing. Your West Coast office picks up the slack when your East Coast office goes home at night. And your East Coast office begins the day. While your West Coast office is still in bed.

No missing calls. No unnecessary overtime.

- But your problem isn't time. Your problem is staffing. You've got people in L.A. Chicago. New York. You don't want Chicago sitting around. Or New

York burning out. With Sprint's Call Allocator, what you don't want, you don't get. You determine what percentage of your 800 calls you want to go to each location.

Talk about maximizing your sales force.

- How about companies that have dealers all over the country? How about them.

With Sprint's Dealer Locator, you no longer have a lot of different 800 numbers in a lot of different states. Your customers call just one 800 number. Enter their zip code. And the calls are routed to the dealer closest to them.

Yes. All those dealers. And one 800 number.

- What about your worst nightmare? Your 800 number goes down. Thanks to Sprint's pre-planned, pre-stored Command Routing, you'll be up and running in minutes.

Sprint. 800 service. Unlimited solutions.  
Call 1-800-788-1000.



**Sprint®**

Not just another phone company.™



# UB adapter card satisfies bandwidth-hungry apps

Architecture provides for high-speed burst rate.

By Skip MacAskill  
Staff Writer

SANTA CLARA, Calif. — Ungermann-Bass, Inc. last week rolled out an Ethernet adapter card that helps users support bandwidth-intensive applications.

The MasterLAN ISA is a 16-bit card for Industry Standard Architecture (ISA) IBM Personal Computer ATs that is based on a bus master architecture, which offloads CPU functions to the adapter card and allows the user to transfer Ethernet traffic to and from host memory at a maximum burst rate of 5.3M bit/sec.

"When the adapter is processing data, it doesn't have to keep interrupting the CPU," said Linda

Klug, product marketing manager for UB, based here.

Bus mastering was developed for Extended ISA- and Micro Channel Architecture-based personal computers, but it can be used to a limited degree on ISA devices, according to Klug.

"That's what allows you to increase the performance of the adapter," she said. "Your average Ethernet workstation adapter card doesn't have that capability."

The card supports Microsoft Corp.'s Network Driver Interface Specification (NDIS) and Novell, Inc.'s Open Data Link Interface (ODI). Network operating systems such as Microsoft's LAN Manager, Novell's NetWare and

Digital Equipment Corp.'s Pathworks are supported through NDIS and ODI.

The MasterLAN adapter is powered by the ChipsLAN chip-set, which was jointly developed by UB and Chips and Technologies, Inc. The two companies formally announced their joint technological agreement last week in conjunction with the release of MasterLAN.

ChipsLAN is a two-chip chipset that can be configured to support either token-ring or Ethernet technologies. It is based on UB's Communications Protocol Application Program Interface, which will allow future applications, such as desktop network management, to reside on the local-area network adapter or motherboard, providing net managers with more information and control of the workstation environment.

MasterLAN will be available in December and will be priced at \$375. □

# Sybase details new tools to deploy client/server apps

By Ron Condon  
IDG News Service

LONDON — Sybase, Inc. revealed plans here this week to deliver a new generation of software designed to provide companies with the tools they need to build and control enterprise-wide client/server nets.

As expected, Sybase's System 10 products include a new release of the SQL Server database; a gateway that transparently links SQL Server and a range of popular mainframe and minicomputer databases; and components that provide distributed transaction processing, net management and multiprocessing capabilities

("Sybase bucks norm with new DBMS tools," NW, Sept. 14).

"System 10 will help people building and deploying client/server applications on a global scale not possible before," said Mark Hoffman, Sybase's president.

Some components of System 10 were developed in collaboration with NCR Corp.'s Large Systems group and will appear first on the NCR 3000 platform before being released for other systems. System 10 will enter beta test early next year and will be released worldwide by the end of 1993, Hoffman said. Sybase is expected to announce the products in the

U.S. this week.

System 10 includes Sybase SQL Server 10, an upgrade to SQL Server that is fully compatible with the ANSI SQL89 standard. It includes new control features such as chargeback accounting, increased security, support for mainframe-scale databases and improved backup facilities.

SQL Server 10 will run first on IBM's OS/2 and Microsoft Corp.'s Windows NT, followed by Unix versions, said Stewart Schuster, Sybase's vice-president of marketing. It will also support standards such as the Open Software Foundation, Inc.'s Distributed Computing Environment.

The new Navigation Server will allow users to build SQL Server databases that exploit "massively parallel" systems. Developed in conjunction with NCR, it

(continued on page 61)

# FCC rejects bid to impose tariffs on smaller carriers

By Anita Taff  
Washington Bureau Chief

WASHINGTON, D.C. — Users with custom network deals from carriers other than AT&T can stop worrying that they may have to divulge proprietary information about their contracts.

The Federal Communications Commission last week said it will not reimpose tariff filing requirements on nondominant long-distance carriers, rejecting a legal challenge from AT&T. The agency also stepped up pressure on foreign carriers to lower international calling charges.

In its decision, the FCC upheld the legality of its rules allowing nondominant carriers to operate without tariffs. Those rules have enabled carriers such as MCI Communications Corp. and Sprint Corp. to negotiate custom network deals through contracts rather than tariffs.

AT&T must file tariffs, even for its custom net deals, and the carrier had charged that such an asymmetrical policy was grossly unfair. Additionally, AT&T said that by letting rivals choose to whom they offer nontariffed deals, the FCC is sanctioning dis-

crimination among users.

But the FCC strongly disagreed. FCC officials said that rather than harming users, the policy of allowing smaller carriers to operate without tariffs has greatly benefited customers.

"The policy has spurred competition and increased consumer options," said FCC Commissioner Sherrie Marshall.

Also, the FCC said its nondominant carrier policy is on solid legal ground. While the Communications Act of 1934 states that carriers must file tariffs, it also gives the agency authority to modify its rules to respond to changing market conditions, according to FCC officials.

AT&T said it was disappointed with the decision and still be-

(continued on page 5)

# SynOptics intros products for SNA/LAN integration

By Skip MacAskill  
Staff Writer

SANTA CLARA, Calif. — SynOptics Communications, Inc. this week is expected to roll out a suite of token-ring offerings that will help users integrate the SNA and local-area network worlds.

Already a leader in the token-ring hub market, SynOptics will bolster its token-ring product line with two twisted-pair modules for its System 3000 intelligent hub, two stackable work group hubs, a stand-alone bridge and an enhanced Lattis EZ-View net management system.

The rollout follows recent token-ring announcements by 3Com Corp. and Cabletron Systems, Inc. and reflects the need for hub vendors to aid users in integrating Systems Network Architecture nets and LANs.

"If you're going to integrate those environments, it makes sense to do it through a hub, which is why you've seen the hub makers shoring up their token-ring offerings," said Todd Dagres, director of communications and research at The Yankee Group, a consultancy in Boston.

The new 12-port hub modules, the 3502B and 3505B, feature a beacon detection capability that prevents a faulty token-ring device from gaining access to the token-ring LAN. The existing 12-port 3502A and 3505A models do not offer that feature.

The 3502B supports shielded twisted-pair wiring and costs \$1,295. The 3505B supports unshielded twisted-pair links and is priced at \$1,795. Both modules are available now.

## Stack 'em up

SynOptics will unveil stackable token-ring hubs that are positioned as an intelligent alternative to passive multimedia access units, such as IBM's 8228.

The new LattisRing 2702-C is a 16-port unmanaged 4M or 16M bit/sec token-ring hub that supports shielded or unshielded twisted-pair connections.

As many as four 2702-Cs can be stacked together in tandem with the new LattisRing 2712 stackable hub, essentially a 2702-C with Simple Network Management Protocol capabilities that enable users to manage the five-hub stack as one device.

Available in February, the 2702-C costs \$1,795. The 2712, also slated to be available in February, comes in a basic version that supports SNMP over Novell, Inc. Internetwork Packet Exchange (IPX) for \$3,395 and an advanced version that supports SynOptics' Automatic Beacon Resolution software and SNMP over the Internet Protocol for \$4,195.

The company will also roll out a stand-alone version of its 3522 token-ring bridge module, which currently resides in the System 3000. The new 2722 is a two-port device that allows customers to bridge between two 4M or 16M bit/sec token rings.

The 2722, which has a forwarding rate of 9K packet/sec based on 64K-byte packets, will support source route bridging in the first release this week, with source routing transparent expected by first quarter of next year. It is priced at \$7,495.

The final piece of the SynOptics announcement will be the new release of Lattis EZ-View Version 2.0, which can support SNMP over both IPX and IP and can be used to manage the new LattisRing offerings. EZ-View 2.0 can be employed to manage as many as 15 SynOptics hubs on small to midsize Ethernets or token rings.

Available now, Lattis EZ-View 2.0 is priced at \$695. Current users can upgrade for \$169. □

## Get in touch with the R.A.F.

The Reader Advocacy Force (R.A.F.) tackles the tough issues facing our readers — the buyers of network products and services. As consumer advocates, we want to hear about any problems you've encountered with products, service and support, or interoperability of equipment, as well as any other concerns you have.

We'll investigate your tip and, if we write about it, we'll send you a T-shirt emblazoned with the Network World R.A.F. logo.

You can contact us via the R.A.F. hotline at (800) 622-1108, Ext. 487 or through the R.A.F. Forum on our electronic Bulletin Board System (BBS). For instructions on using the BBS, see page 2.

NETWORK WORLD'S



READER ADVOCACY FORCE



# AT&T, McCaw reshape landscape

*continued from page 1*

ecutive officer of AT&T.

AT&T hopes to leverage McCaw's large cellular net — which serves about 20% of the 10 million U.S. cellular users — to grow its core long-distance business and introduce a bevy of new products and services, Allen said.

The companies plan to provide "a seamless nationwide cellular and land-line network" that will enable users to place calls the same way no matter where they are calling from, said Dale Stone, director of personal communications networks at AT&T. Today, callers face "some rather awkward procedures," he added.

The ultimate scenario would be for pocket phone users to be reachable via the same phone number regardless of where they are located.

AT&T also has an investment in start-up EO, Inc., a Mountain View, Calif., company developing equipment to be used with wireless networks. EO last week unveiled what it claims are the first "personal communicator" devices. The 2.2- and four-pound devices have a cellular phone and feature electronic mail, a personal organizer, facsimile and other capabilities.

The agreement would also give McCaw unprecedented access to AT&T resources, including the AT&T brand name and AT&T Bell Laboratories (see graphic, this page).

"It wouldn't surprise me to see Bell Labs make great strides in cellular technology," said Michael Kilbane, general manager of systems development at Diamond Shamrock Refining and

Marketing Company, Inc. "This bodes well for the future of wireless."

New products and services will complement existing wireless efforts. AT&T's messaging unit, AT&T EasyLink Services, is going after mobile professionals via various developments and partnerships, including one with RAM Mobile Data that allows for wireless electronic mail.

## Local access

The deal is also significant because it will pit AT&T against the

John Ahsler, a senior consultant at The Eastern Management Group, a market research firm in Parsippany, N.J., said the regional Bell holding companies may have a good argument.

"I think the RBHCs will say to the regulators, 'You're letting AT&T have it both ways, but not us,'" he said. "They may use that to get the regulators to let them into some of AT&T's businesses, such as long distance."

The AT&T-McCaw deal would also give the long hauler a new way of providing access services, although AT&T denies it would use the technology in this way.

While technically feasible to-

denly decide to move en masse to wireless to access long-distance services," said Daniel Briere, president of TeleChoice. "But there will be some movement."

Don Rees, vice-president of telecommunications for the First National Bank of Maryland in Baltimore, said, "I'd consider using wireless service to reach long-distance carriers' [points of presence]." If nothing else, wireless could be useful for local access after disasters, he said.

But Joie Pacifico, director of marketing and operations for AT&T's wireless communications services group, downplayed the idea.

"This is not a local access game," Pacifico said. "It's very unlikely anyone would use wireless to bypass the BOCs."

## AT&T gets toehold

One thing seems clear. The deal — which calls for AT&T to buy all of BT's 35.8 million shares of McCaw stock and 47 million newly issued shares — would give AT&T a leg up in the wireless market over rivals MCI Communications Corp. and Sprint Corp., neither of which offers cellular services, observers said.

"Users are moving quickly toward the mobile office," Briere said. "By investing in McCaw, AT&T is positioning itself to capture a huge amount of this emerging market — more than either MCI or Sprint can lay claim to."

MCI, which sold its cellular and paging assets to McCaw in 1986, declined to comment on its wireless communications plans. Sprint plans to offer cellular services pending completion of its acquisition of Centel Corp. **■**

## Anatomy of the AT&T-McCaw alliance



McCaw Cellular Communications, Inc.

### If consummated:

- AT&T gains 33% stake in McCaw, which retains its management team and remains independent. AT&T has the option to buy voting control.
- AT&T licenses its brand name to McCaw to promote its wireless services.
- McCaw markets wireless services under AT&T name.
- McCaw engineers gain access to AT&T Bell Laboratories' R&D.
- AT&T gives McCaw access to its marketing and distribution resources.
- McCaw retains right to engage in joint ventures with other vendors, including the Cellular Digital Packet Data project under which McCaw, IBM and numerous regional carriers are building a national cellular data network.

GRAPHIC BY SUSAN SLATER

SOURCE: MCCAW CELLULAR COMMUNICATIONS, INC., KIRKLAND, WASH.

BOCs in local service, an idea being met with some resentment.

"AT&T will be competing head-to-head with the regional Bell companies in yet another market," said John Connarn, vice-president of federal relations for Ameritech. "Meanwhile, the regional Bell companies continue to be banned from many markets open to AT&T."

day, it is not practical to use cellular services for local access because of the limited available radio spectrum. But this could change as McCaw migrates from analog to digital technology, which will increase its switch capacity by at least three times and eventually 10 times.

"You're not going to see half of a BOC's local access users sud-

# Oracle glues desktops to net

*continued from page 1*

front-end application support needed to deploy distributed client/server applications across an enterprise network ("Oracle may unbundle key piece of network software," *NW*, Oct. 26).

"Users have made a significant investment in client tools, back-end servers, and networks," said Marc Benioff, corporate vice-president of Oracle's New Technology Division. "Now we are offering an architecture with a product that lets them glue it all together."

For years, Oracle has been investing heavily in developing communications and system software to support its relational database management system on more than 80 platforms and every major network.

Now, recognizing that this work could be leveraged to support other distributed applica-

tions from a common API at the desktop, Oracle is beginning to make its move.

With Oracle Glue, the company is providing developers with core technology that can be embedded in client applications in different operating environments to provide access to back-end servers.

This software consists of a high-level API that will allow developers to deploy consistent commands within client applications, essentially providing a higher level of service than the vendor- or platform-specific APIs.

In this way, it does not matter whether a developer is using Microsoft Corp.'s Visual Basic or Apple Computer, Inc.'s HyperCard on the Macintosh to access a back-end database server; the Oracle Glue syntax remains the same.

In the initial Version 1.0 release, however, Oracle Glue supports only the Microsoft Windows

environment.

Once implemented, this version will make it possible for Windows applications to call on a set of Dynamic Link Libraries to provide access to back-end servers.

Oracle has already done the work to allow Oracle Glue to be supported in applications such as Microsoft's Visual Basic and Excel, Lotus Development Corp.'s 1-2-3 and Ami Pro, as well as any application that supports Microsoft's Dynamic Data Exchange protocol.

On the server side, Oracle Glue supports Oracle Server and Oracle Mail, IBM's DB2, Borland International, Inc.'s dBase and Paradox files, and Sharp, Inc. Wizard palmtops.

Analysts seemed impressed with Oracle's strategy but expressed concern whether the database giant will be able to be a factor in the more mainstream operating system business.

"Oracle Glue's data access capabilities are a logical extension

to the work Oracle has done at the transport level with its SQL\*Net product," said John Rymer, vice-president of Patricia Seybold Office Computing Group in Boston. "But the question is if Oracle will be able to be recognized as a systems software player outside of its core database business."

Oracle's Benioff says Oracle Glue is an ambitious project that will be deployed by component and platform over time.

"With Oracle Glue, developers can build applications today with the knowledge that in the future, they will be able to migrate their applications to other platforms and include other data sources without changing their applications," he said.

The Oracle Glue for Windows Version 1.0 software development kit costs \$2,995 and will be available in April 1993.

The kit includes a run-time license for unlimited distribution of applications at no extra charge. **■**

# FCC rejects bid to impose tariffs

*continued from page 4*

believes the policy is illegal. The carrier will likely hold off on further action until a federal appeals court here rules on an earlier complaint from AT&T that deals with this same issue.

Donald Elardo, counsel for MCI Communications Corp., said the carrier was pleased with the decision. He said it is clear that Congress approves of the FCC policy since several pieces of legislation have included references to carriers' ability to operate by either contract or tariff.

Last week, the FCC also set target prices it wants foreign carriers to charge for terminating calls from the U.S. — charges known as international accounting rates. Currently, the FCC estimates that some foreign carriers are overcharging U.S. carriers by as much as 50% on accounting rates.

If the cost of terminating calls drops, the FCC believes the charges users pay will also fall. In 1990, the FCC launched a proceeding to see how it could help carriers bring down the accounting rates. Carriers are responsible for negotiating international accounting rates with foreign countries.

Cheryl Tritt, FCC Common Carrier bureau chief, said U.S. carriers have made progress in lowering the rates in 75 countries, but they are still too high.

The agency stepped up the pressure last week by setting benchmark prices it wants foreign carriers to adopt. The FCC said accounting rates for Europe should be between 23 and 39 cents per minute. For Asia, the rates should be between 39 and 60 cents per minute.

Currently, Sweden, the U.K., Singapore and Australia are the only major countries with rates that meet the benchmark level in their respective regions. Most countries are at least 10% to 15% higher than the benchmarks, according to the FCC.

The FCC will give U.S. carriers two years to work with foreign carriers to meet these goals. After that, if prices are too high, the FCC may take more drastic actions, such as attempting to set a ceiling on how much U.S. carriers can pay for international accounting rates or placing restrictions on foreign carriers wanting to operate in the U.S. if they charge excessive rates.

Tritt said these are "actions of last resort" but that the FCC would be willing to carry them out if necessary to bring down accounting rates. The U.S. currently has a \$4 billion deficit in telecommunications services with foreign countries. **■**



## IEEE to weigh fast alternatives

*continued from page 1*

Three major vendor groups will present to the committee this week their views on what should be included in the standard for this new technology. 3Com, SynOptics, Sun Microsystems Computer Corp. and LAN Media Corp. are spearheading one effort, while HP and AT&T Microelectronics are leading the second and Grand Junction the third.

Although all vendors involved want the same result — a published standard for 100M bit/sec Ethernet — the three groups are proposing different approaches to boosting the speed.

3Com said its group's proposal stresses the importance of adhering to the current Ethernet standards and protocols so that 100M bit/sec Ethernet will be cost-effective, although it would not provide further details.

"Preserving the Ethernet [media access control] protocols is essential," said Doug Spreng, vice-president and general manager of the Network Adapter Division at 3Com. "By not changing the spec, users can employ the same network management techniques and applications."

As part of the same presentation, LAN Media will address the trade-offs of developing a standard for 100M bit/sec Ethernet, according to Ron Crane, president and founder of LAN Media.

"There are many trade-offs with respect to noise and the possible price range of such a system, depending on the type of voice-grade cable you use," he said. "Some sites have such high noise that you may need to add an extra wire pair."

This extra wire pair would not only add to the cost of the system, but also 10Base-T users would have to rewire their systems.

Todd Dagres, director of communications and research at The Yankee Group, a Boston-based consultancy, noted that using extra wire pairs would also necessitate a change in the Ethernet MAC-layer protocol.

"If changes have to be made to the MAC protocol, then vendors lose their strongest argument for having users adopt this new technology, [which is] that existing gear and protocols can be used," he said. "The standard for 100M bit/sec Ethernet has to resemble regular Ethernet as closely as possible so the cost of migration can be held to a minimum."

HP agreed, adding that support for emerging applications such as multimedia and desktop videoconferencing should be included. HP's proposed implementation would work over the same wiring currently used in 10Base-T.

"Traditional 10Base-T uses two four-pair wires to the desktop, one for voice and one for data," said Bryce Clark, strategy and planning manager for HP's Roseville Networks Division. "We plan to use the same wiring."

As for cost, Clark said HP currently prices a typical 10Base-T implementation at \$200 per port.

"We expect [100M bit/sec Ethernet] to be one to two times that price," or about \$400 per port, he said. And this price is bound to come down as the technology becomes more prevalent, he added.

Grand Junction will also address the 802.3 committee this week, but the company declined to provide details on what its presentation will include.

Only one company, MicroAccess, Inc. of San Jose, Calif., is shipping 100M bit/sec Ethernet products. Its OptiLAN Fast-Ethernet 16-bit card, which shipped in September, costs \$699

**"ATM will take over WANs, but you just can't move it to the PC level," Norton said.**



— less than many higher end Ethernet cards that provide only 10M bit/sec transmission.

Such pricing could make 100M bit/sec Ethernet a viable option for high-speed desktop connections as compared to technologies such as Asynchronous Transfer Mode (ATM), Fiber Distributed Data Interface and Copper Distributed Data Interface.

"ATM will take over WANs, but you just can't move it to the PC level," said Robert Norton, vice-president of engineering at MicroAccess, Inc. "It's too expensive."

MicroAccess has not said when it will present its patented methodology to the Institute of Electrical and Electronics Engineers, Inc., but it was the only firm to provide technical details on its technology.

According to a company white paper, with 10M bit/sec Ethernet, data is transmitted over a local-area network by sending one-bit signals per clock cycle, so eight clock cycles are required to send one byte of data.

To make twisted-pair cabling a viable medium for higher speeds, MicroAccess' Differential Code Modulation scheme allows nine bits of information to be sent in one clock cycle on a cable that has six wire pairs, thereby drastically increasing the data rate. ■

## Vendors team up to build system

*continued from page 2*

and marketing at Symbologic.

Chelius said the product will give support staffers easy access to both product and customer information, such as user network configurations and case studies of problem resolutions.

The client/server-based product will include Microsoft Corp. Windows or X Window System clients that can access a DOS- or Unix-based "knowledge server." The server will provide access to popular databases, expert systems and other support systems, including voice response units and call tracking applications.

"Our goal is to design a product that will provide support personnel with all the information they need to solve a problem and enable them to manipulate information so that they can find answers to customers' problems more efficiently," Chelius said.

The product will enable customer support departments to integrate what are often separate support elements, said Al Hahn, president of Hahn & Co., a Portland, Ore., consulting firm specializing in service and support.

For example, a staff member might need to swivel among sepa-

rate computers supporting on-line product documentation, customer network configuration data, call tracking and field service applications, and expert system-based diagnostic tools. By linking all of these separate systems to the knowledge server, customer support personnel would be able to access any system from a single-client computer linked to the server, he said.

"Support engineers are supposed to spend the majority of their time troubleshooting problems," Hahn said. "But from what I've observed at customer support departments, they spend more time being traffic cops, directing customers to the right source of information."

The product should also free up top engineers by enabling less-skilled support staff members "to go further along in the troubleshooting process," Hahn said. "This product should dramatically improve the quality of support network managers receive."

Dave Temlak, manager of Banyan's support services group, said the consortium will allow Symbologic to provide vendors with a higher quality knowledge management system in less time and at a lower cost than would have been possible if they each had worked separately with Sym-

## Customer Support Consortium members

- ◆ Active Voice Corp.
- ◆ Advanced Technology Laboratories
- ◆ Banyan Systems, Inc.
- ◆ BBN Software Products Corp.
- ◆ ComputerLand Corp.
- ◆ Compuware Corp.
- ◆ Digital Communications Associates, Inc.
- ◆ Dun & Bradstreet Software
- ◆ Hewlett-Packard Co.
- ◆ Intel Corp.
- ◆ Maxtor Corp.
- ◆ NCR Corp.
- ◆ The Santa Cruz Operation, Inc.
- ◆ Silicon Graphics, Inc.
- ◆ Sybase, Inc.
- ◆ 3M Co.
- ◆ US West Communications, Inc.
- ◆ Washington State Information Processing Co-op

SOURCE: SYMBOLOGIC CORP., REDMOND, WASH.  
GRAPHIC BY SUSAN SLATER

bologic or another company.

The product will be targeted at vendors initially, but vendors will also likely provide it to their customers and resellers as part of product support contracts, he added.

By using the same basic knowledge management system, vendors will be better able to provide multivendor support, Chelius said.

For more information on the consortium, call Chelius at (206) 881-3938, Ext. 307. ■

## Fed'l Reserve commits to OSI net

*continued from page 2*

transfer, electronic mail, cash management data and wire transfers of funds.

According to the Federal Reserve, it had adopted the use of OSI standards as a strategic direction for data communications, with the primary goal of giving its users a standardized way to link to the Fed's network.

### Getting with the times

The current FedNet is based on IBM's LU 6.1 protocol and 3790 terminals. LU 6.1 is a little-used protocol that the Federal Reserve employs primarily for transaction processing applications between its mainframe-based CICS and IMS environments.

The 3790 is an antiquated distributed processing system that has been largely replaced in the commercial world by Application System/400s or networked personal computers, according to analysts.

The FedNet system has been a dinosaur for years, said a network manager at a major bank who requested anonymity.

"The IBM transaction processing interface is cumbersome and expensive," he said. "The OSI/FTAM interface is easier to work with and will provide a much more standardized interface to all of the other systems on

the [Federal Reserve's] banking network."

FTAM is the OSI protocol for creating, accessing and moving large files between dissimilar systems.

According to sources, the bank determined that current networking technology could not deliver the level of service and connectivity its member banks

**F**ull support for OSI protocols on a large scale by the FedNet is several years away.



will need.

According to Peter Crotty, an IBM OSI product administrator, the Federal Reserve's move to OSI will free the bank from having to document and explain all of the different ways its users can link to its network.

"The Federal Reserve can point to [the National Institute of Standards and Technology] or other OSI documents and say, 'that's how we want you to com-

municate with us,'" Crotty said. "It takes them a step away from the networking business and lets them concentrate on banking."

### One step at a time

But full support for OSI protocols on a large scale by the FedNet is several years away, said a Federal Reserve spokesman in the bank's Electronic Access Office, which is overseeing the OSI implementation. He said the bank will first present OSI as an option to customers while it continues to support current Federal Reserve protocols.

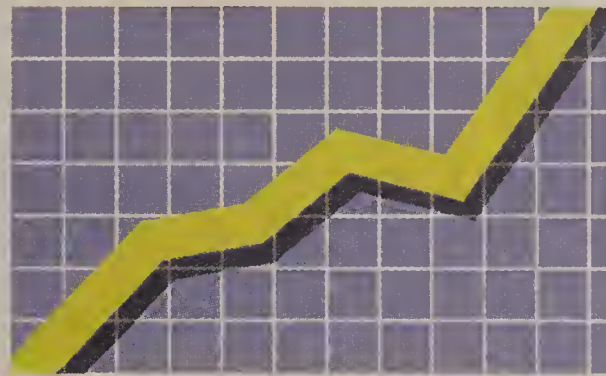
Currently, the Reserve is in the first phase of its OSI project. It is conducting a survey of member banks to determine customer needs and developing guidelines for the OSI products it will purchase. The bank is also surveying vendors to check on the status of OSI-compliant product development.

The Federal Reserve is already testing select X.400 and FTAM products, including a full suite of IBM OSI products ranging from its OSI/Communications Subsystem to its X.400 DISOSS Connection software.

"[FedNet] is going about implementing OSI gradually, so when they go into full-production mode, they will have expertise and familiarity with the network," Crotty said. "There will be no surprises." ■



# RISC. AND REWARDS.



**NETWORK PERFORMANCE**



**NETWORK RELIABILITY**

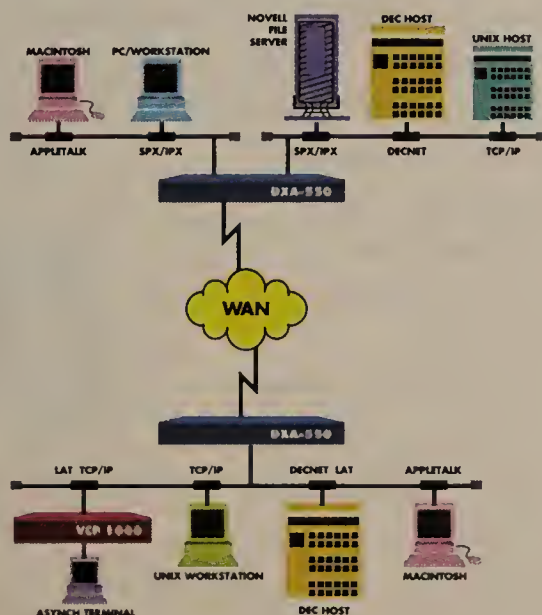


**NETWORK SAVINGS**

## INTRODUCING THE DXA-550 • A FULL-FEATURED BRIDGE/ROUTER FROM DATABILITY.

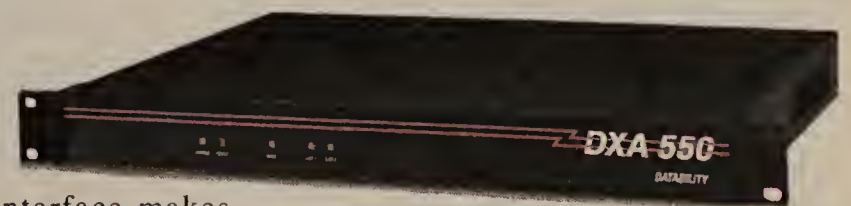
At Datability, tangible rewards are engineered into everything we build: Our new DXA-550 is a RISC-based bridge/router that delivers exceptional performance and high reliability at an incredibly low cost. At under \$5,000, it's up to \$1,000 less than conventional routers. As a table top or rack mount unit, the multi-port DXA-550 comes standard with TCP/IP, Novell SPX/IPX and XNS, while providing concurrent local and remote bridging and routing solutions for complete work-group interconnectivity.

Designed to deliver maximum data packet transfer, the DXA-550 will never be a bottleneck when connecting multiple LANs. Its custom filtering tool allows the network to be divided to reduce congestion



and increase security. The comprehensive menu-based user interface makes

configuration and control a snap. And it provides industry-standard SNMP management for centralized local or remote access. Invest for tomorrow's growth today and you'll be handsomely rewarded.



For more information about the DXA-550 from Datability call:

**(800) 456-7844**

In New Jersey, call (201) 438-2400. Or, fax us at (201) 438-2688.

**DATABILITY**  
Sophisticated Technology Made Simple



**FAX**

**UNIX**

**IBM  
PC & MCA**

**MAC**

**WINDOWS**

**57,600  
BPS**

# FasTalk™ hits the fast lane: new features mean new modem versatility

FasTalk, the UDS modem line designed especially for personal computer applications, hits the road with a bundle of new features that deliver more versatility than ever.

The new FasTalk 32bx sets the

pace with 57.6 kbps throughput, using the international V.32 *bis* standard. It also offers synchronous and asynchronous protocols with either Hayes "AT" or V.25 *bis* auto dialing.

The FasTalk 32bx supports UNIX systems by utilizing a much faster and more efficient file transfer technique called "G-Protocol" spoofing. Your UNIX system will be able to send and receive files much faster than with conventional modems.

Other FasTalk products showcase the line's exceptional versatility. Some support Apple Macintosh, while others are specifically designed for systems running Windows. Still others feature Group III Class 1 FAX along with a fully featured, high-speed modem, allowing you to send

receive both data and FAXes from the same equipment.

Pull out into the fast lane with your PC, MCA, Mac or UNIX machine. For detailed specs and new, low prices, contact UDS today at:

**800/451-2369**

**UDS**



**MOTOROLA**

*Quality Means The World To Us.™*

All brand and product names are trademarks or registered trademarks of their respective owners.



THE FASTALK FAMILY now offers economical, feature-rich support for UNIX, Mac, DOS and Windows applications. FAX is also available.



# DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

## Worth Noting

“We think that vendors such as Cisco [Systems, Inc.] and the others in the [Advanced Peer-to-Peer Internetworking] forum are doing the industry a disservice. Those vendors should just get on with the business of making SNA networks work on internets.”

**Janet Hyland**  
Director of network  
strategy research  
Forrester Research, Inc.  
Cambridge, Mass.

## Newbridge buys into ACC's internetworking strength

Firms will codevelop frame relay, ATM products.

By Jim Duffy  
Senior Editor

SAN FRANCISCO — Newbridge Networks, Inc. has laid the foundation for providing LAN bridging and routing in frame relay and ATM networks by purchasing an equity stake in Advanced Computer Communications, Inc. (ACC).

The arrangement calls for Newbridge and ACC to jointly develop LAN internetworking products that provide users with access to frame relay and Asynchronous Transfer Mode networks. Additionally, the products will allow carriers to provide bridging and routing services in those nets.

The agreement, terms of which were not disclosed, dovetails with Newbridge's recent an-

nouncement that it is purchasing exclusive rights to MPR Teltech's ATM technology (“Newbridge goes outside for core of ATM switch,” *NW*, Oct. 26).

The ACC pact fits with Newbridge's plan to tap technology already in the market, instead of dedicating time, money and human resources to developing similar functions internally.

“We tried to avoid reinventing the wheel, so we went looking for strengths in the internetworking market,” said Peter Sommerer, Newbridge's chief operating officer.

The first phase of the Newbridge-ACC alliance will produce two devices — the 8231 Main-Street Ethernet Router and the 8251 MainStreet Token Ring  
(continued on page 14)

## Alcatel unveils X.25 pack, GOSIP test accreditation

By Ellen Messmer  
Senior Correspondent

PLEASANTON, Calif. — Alcatel TITN, Inc. has announced software that lets its PC-COM 188 and PC-COM 100 synchronous communications adapter boards support links to X.25 networks.

Alcatel TITN has announced a new version of its Twice Streams X.25 software that runs on the adapter boards, which work with machines outfitted with an AT bus. The board and software combination will let an MS-DOS or Unix personal computer send and receive X.25 data at speeds up to 64K bit/sec.

In the past, Alcatel TITN has offered Twice Streams X.25 as source code, but this February, the company will be shipping the software as an end-user product for the first time.

“Any application written to run on X.25 could use this as a standard interface,” said Doug Grover, Alcatel TITN's Northeast account manager.

Alcatel TITN also announced it has been accredited by the U.S. government's Joint Interoperability Test Center (JITC) as a third-party laboratory with its own approved testing tools regis-

tered to perform Government Open Systems Interconnection Profile (GOSIP) Version 2.0 testing of vendor products.

Alcatel TITN's government-registered lab can test vendor OSI products for GOSIP conformance and sell the Alcatel TITN testing system separately as a GOSIP test tool.

Alcatel TITN's test tool — Unix Remote Tester of Layered Entities — is accredited to perform testing of the new OSI protocols listed in GOSIP Version 2.0, which became a required government purchasing mandate this month.

Alcatel TITN is now officially authorized to test GOSIP 2.0 protocols — End System to Intermediate System; Transport Class 0; Transport Class 4 for either connection-oriented or connectionless network services; and X.400 and File Transfer, Access and Management (FTAM), which both contain updated abstract test suites.

“We could have remained GOSIP Version 1.0-accredited, but we saw enough market opportunity to go to GOSIP 2.0,” said Michael Thomas, Alcatel TITN's director of sales. □

## Telematics' NetFrameXchange product line

NFX model	Total ports	Maximum line configuration	Price	General availability
10	6	5 local/1 trunk	\$3,500	3/93
20	42	40 local/2 trunk	\$6,200	3/93
30	26	24 local/2 trunk to 8 local/18 trunk	\$11,400	4/93
40	50	48 local/2 trunk to 12 local/38 trunk	\$17,700	1/93
400	50	48 local/2 trunk to 12 local/38 trunk	\$17,700	1/93
500	480	478 local/2 trunk to 472 local/8 trunk	\$51,500	1/93
7100	30	24 T-1/6 T-2	\$56,100	5/93
7300	80	64 T-1/16 T-2	\$61,100	5/93
7500	280	224 T-1/56 T-2	\$147,600	5/93

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: TELEMATICS INTERNATIONAL, INC., FORT LAUDERDALE, FLA.

## Telematics rolls out its frame relay line

NFX family includes range of models from access devices to central office-based carrier switches.

By Michael Cooney  
Senior Editor

FORT LAUDERDALE, Fla. — Telematics International, Inc. last week introduced a new line of frame relay products intended to make the company a one-stop shop for everything from customer premise access devices to central office frame relay switches.

The company's new NetFrameXchange (NFX) is a family of Reduced Instruction Set Computing-based processors that will include nine frame relay access, concentration and backbone models, as well as a companion open systems-based network management platform. As their networks grow, users can field upgrade any NFX model to a larger model by adding new software and boards.

The new Telematics switching products contain data communications equipment and data terminal equipment interfaces, making them suitable as frame relay switches or access devices. Users can employ the products to build private frame relay nets, and carriers can use them to offer scalable frame relay services.

“Other vendors are supporting frame relay in existing packet-switched products modified to handle frame relay,” said Lawrence Cattell, senior vice-president of marketing at Telematics. “We are now offering a product line built exclusively for frame relay transmissions.”

Four NFX models constitute the access or customer premises equipment.

The NFX 10 is the entry model and will support one frame relay trunk with data speeds up to 64K bit/sec and five local ports supporting asynchronous, Synchronous Data Link Control or X.25 lines operating at up to 19.2K bit/sec.

The Model 20 supports two frame relay trunks with data speeds of up to 384K bit/sec each and 40 asynchronous, SDLC or X.25 lines at speeds up to 64K bit/sec.

Moving up the scale, the NFX 30 and 40 can handle frame relay data throughput up to 512K bit/sec on each wide-area link and local port speeds up to 256K bit/sec.

“The access products will let users migrate existing SNA/SDLC, asynchronous and X.25 traffic onto a frame relay net at a low cost,” Cattell said. “These products provide remote SNA users a faster, less expensive alternative to leased lines.”

Telematics' backbone switching products begin with the NFX 400 and 500. Both models support SDLC, asynchronous, X.25 and bisynchronous communications at local port speeds up to 256K bit/sec (see graphic, this page).

The NFX 400 supports a maximum of 50 ports, up to 38 of  
(continued on page 14)

## Data Packets

**Digital Equipment Corp.** has brought out software for managing large TCP/IP networks that have Unix systems distributed throughout.

Polycenter SNMP Manager 300 Version 1.2 is a distributed network management system that allows multiple network operators to manage networks of up to 10,000 nodes. It supports the Simple Network Management Protocol and runs on a Reduced Instruction Set Computing-based DECstation or DECsystem under Ultrix.

Polycenter SNMP Manager discovers network topology changes involving Transmission Control Protocol/Internet Protocol and DECnet nodes. It also monitors network events by trapping changes in device and net configurations, and sending alarms to notify managers of those changes.

Polycenter SNMP Manager 1.2 is priced at \$7,070 for an unlimited site license and will be available in February. □



Building inexpensive computers isn't exactly earth-shattering news.

Building inexpensive computers that still deliver IBM quality is.

Yet, that's precisely what PS/ValuePoint™ does.

## Introducing PS/ValuePoint



*Model 325T*  
386 SLC™ 25 MHz System  
2MB RAM, 80MB HD  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
DOS 5.0 Pre-installed  
PS/2® 8511  
Color Display-VGA  
**\$1,299\***

PS/ValuePoint is a whole family of computers that lets you spend less, without settling for less. Lets you economize, without compromise.

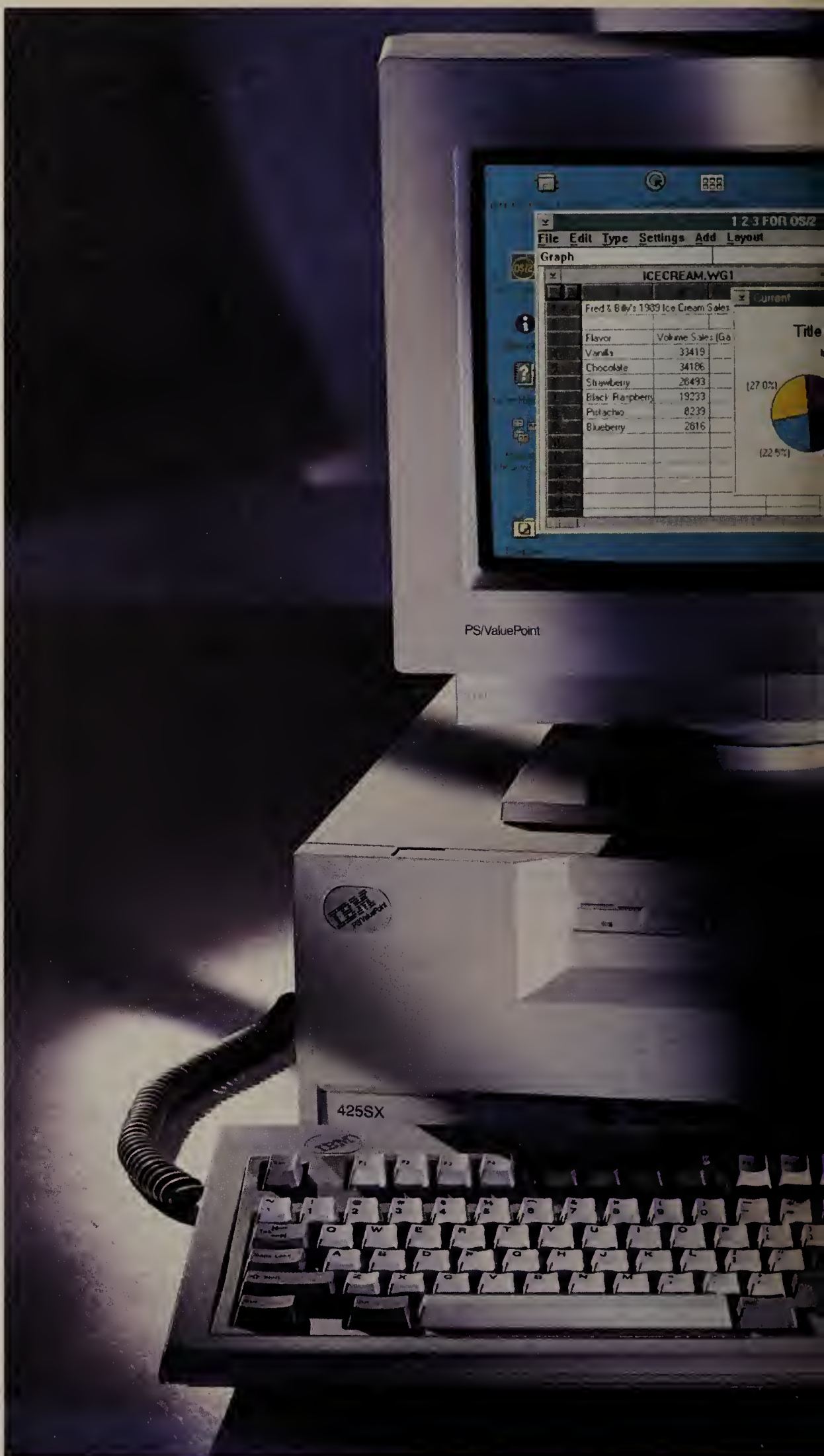
Each PS/ValuePoint is engineered to the IBM standards that have defined the personal computer industry. And rigorously tested to meet IBM's stringent demands for quality and reliability.

The PS/ValuePoint family is fully networkable, and Novell®-certified for use with Ethernet or Token-Ring LANs. So the PS/ValuePoint not only keeps your costs down, it protects the investments you've already made.

IBM also provides expandability for base products by offering new IBM hard drives, diskette drives and memory upgrades.



\*IBM prices, dealer prices may vary. \*\*Next business-day response when serviced by IBM or IBM Authorized Personal Systems Servicers. Available Monday-Friday, 8 a.m. to 5 p.m. in your time zone. Warranty and 30-day guarantee information available from IBM or IBM authorized dealers. ††In Canada, call 1 800 465-7999. IBM, OS/2 and PS/2 are registered trademarks and PS/ValuePoint, SLC, HelpWare and HelpCenter are trademarks of International Business Machines Corporation. Novell is a registered trademark of the Novell Corporation. The Intel Inside logo is a trademark of Intel Corporation. © 1992 IBM Corp.



†Models 425 SX and 433 DX are shown with the PS/ValuePoint 6314 Color Monitor.

# Computers that do pr for practic





And every PS/ValuePoint includes one other very important point—HelpWare™, IBM's unparalleled service and support that offers one-year, on-site, next-business-day service.\*\* Around-the-clock assistance by telephone, bulletin board or automated fax. A 30-day money-back guarantee.\*\* Licensed Education Centers. And a generous trade-in program. Plus, IBM Credit Corporation has flexible leasing and financing packages to meet your needs.

That's a support package you might not expect even on the most expensive computers. On the PS/ValuePoint it's nothing short of phenomenal. As you can see, we've stripped down the price—but not the product.



*Model 433 DX<sup>+</sup>  
486 DX 33 MHz System  
8MB RAM, 120MB HD  
Upgradable Processor  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
OS/2® 2.0 Pre-installed  
PS/ValuePoint 6312  
Color Display  
**\$1,999\****

Power. Quality. Service. Support. The PS/ValuePoint is everything you could ask for in a computer at much less than you'd expect us to ask.

For more information or an IBM authorized dealer near you, call our Personal Systems HelpCenter™ at 1 800 772-2227††

*Model 425 SX  
486 SX 25 MHz System  
8MB RAM, 80MB HD  
Upgradable Processor  
5 AT Slots/5 Bays  
IBM Enhanced Keyboard/  
Mouse/SVGA  
OS/2 2.0 Pre-installed  
PS/ValuePoint 6312  
Color Display  
**\$1,629\****

**IBM®**

actically everything,  
ally nothing.



# Cray offers high-end frame relay switch with bridge/router modules

By Jim Duffy  
Senior Editor

ANNAPOLIS JUNCTION, Md. — Cray Communications has brought out a frame relay switch that combines fast packet and circuit switching to support voice, data and video traffic.

The FPX2000 is targeted at both central

office and customer premise applications. It supports T-3, 51M bit/sec Synchronous Optical Network Optical Carrier (OC)-1 and 155M bit/sec OC-3 services, has a backplane speed of 196M bit/sec, and can bridge and route 128-byte Ethernet, token-ring and Fiber Distributed Data Interface local-area network packets at 160K

packet/sec.

The FPX2000 comes in two configurations. A five-slot chassis holds five two-port T-1/E-1 wide-area network cards. On the local side, the FPX2000 currently can be configured with five six-port synchronous communications cards. Each port on the synchronous cards supports speeds from 56K to 2M bit/sec, or E-1.

A 21-slot version of the FPX2000 supports as many as 40 T-1/E-1 trunks and 120 56K bit/sec-to-E-1 synchronous ports. For lower speed synchronous and asynchronous traffic, users can use the

FPX2000 as a front end with a packet assembler/disassembler or concentrator, said Scott Rey, senior marketing manager for Cray.

Pricing for the FPX2000 starts at \$5,000. The dual T-1/E-1 cards are priced at \$5,000 each, and the synchronous communications cards have a price tag of \$4,000. The switch will be available in the second quarter of 1993.

A card for funneling packetized voice traffic over frame relay nets will be released in the spring of 1993, Rey said. The card will support 30 64K bit/sec channels.

A four-port bridge/router card supporting either Ethernet, token-ring or FDDI LANs will be released in mid-1993, and a T-3 card will emerge in the fourth quarter of 1993. Cray is looking to release OC-1 and OC-3 cards by early 1994, Rey said.

By late summer of next year, the FPX2000 will also support North American and European Integrated Services Digital Network Primary Rate Interfaces.

## LEARNING TO SHARE IS HARD



### But the MultiComAsyncGateway<sup>TSR</sup> Eases Users Into Modem Sharing... Inexpensively and Risk-Free.

Most LAN managers know that modem sharing is cost effective. But they're reluctant to invest in a dedicated gateway, for fear of resistance and confusion among users. The MultiComAsyncGateway<sup>TSR</sup> can get users accustomed to communications via a modem attached to another PC, without spending thousands on a full-blown gateway.

#### Think of it as a Gateway "Trainer."

For under \$400, the MultiComAsyncGateway<sup>TSR</sup> is a functional modem sharing system that lets users access one or two modems attached to another PC - any other PC - on the LAN. You can even make use of an "obsolete" 286 by making it the non-dedicated communications server for your modem pooling.

#### Sharing Modems is Easier Than You Think.

Thanks to the MultiComAsyncGateway<sup>TSR</sup>, it's never been easier. And there's never been an easier or more risk-free way to test whether the benefits of gateway technology can benefit your network.

When it comes time to upgrade to a high performance, dedicated gateway ... like the MultiComAsyncGateway2 ... the price of the MultiComAsyncGateway<sup>TSR</sup> is credited back to you. For more information, call us at 1-800-328-9717.



# MultiTech<sup>®</sup> Systems

*The right answer every time.*

Multi-Tech Systems, Inc., 2205 Woodale Drive  
Mounds View, Minnesota 55112 U.S.A.  
(612) 755-3500, (800) 328-9717, U.S. FAX (612) 755-9874  
Technical Support (800) 972-2439  
International Telex 4998372, International FAX (612) 331-3180

It is targeted at users looking to protect their existing investments in DSUs, LANs, X.25 PADs and other devices.



The FPX2000 is designed as a migration path to packetized digital networking for users that now employ a mix of analog and digital circuit and packet switching devices, Cray said. It is targeted at users looking to protect their existing investments in data service units (DSU), LANs, X.25 PADs and other devices.

The architecture of the FPX2000 is designed to support Asynchronous Transfer Mode cell switching over time, Rey said.

With the FPX2000, Cray will go head-to-head against switches from competitors Cascade Communications Corp., Newbridge Networks, Inc. and StrataCom, Inc.

Newbridge's 36120 MainStreet switch provides throughput of 100K packet/sec for 64-byte packets. Cascade's STDx switch forwards 24,000 64-byte packet/sec, and StrataCom's IPX forwards 100-byte packets at 2,500 packet/sec.

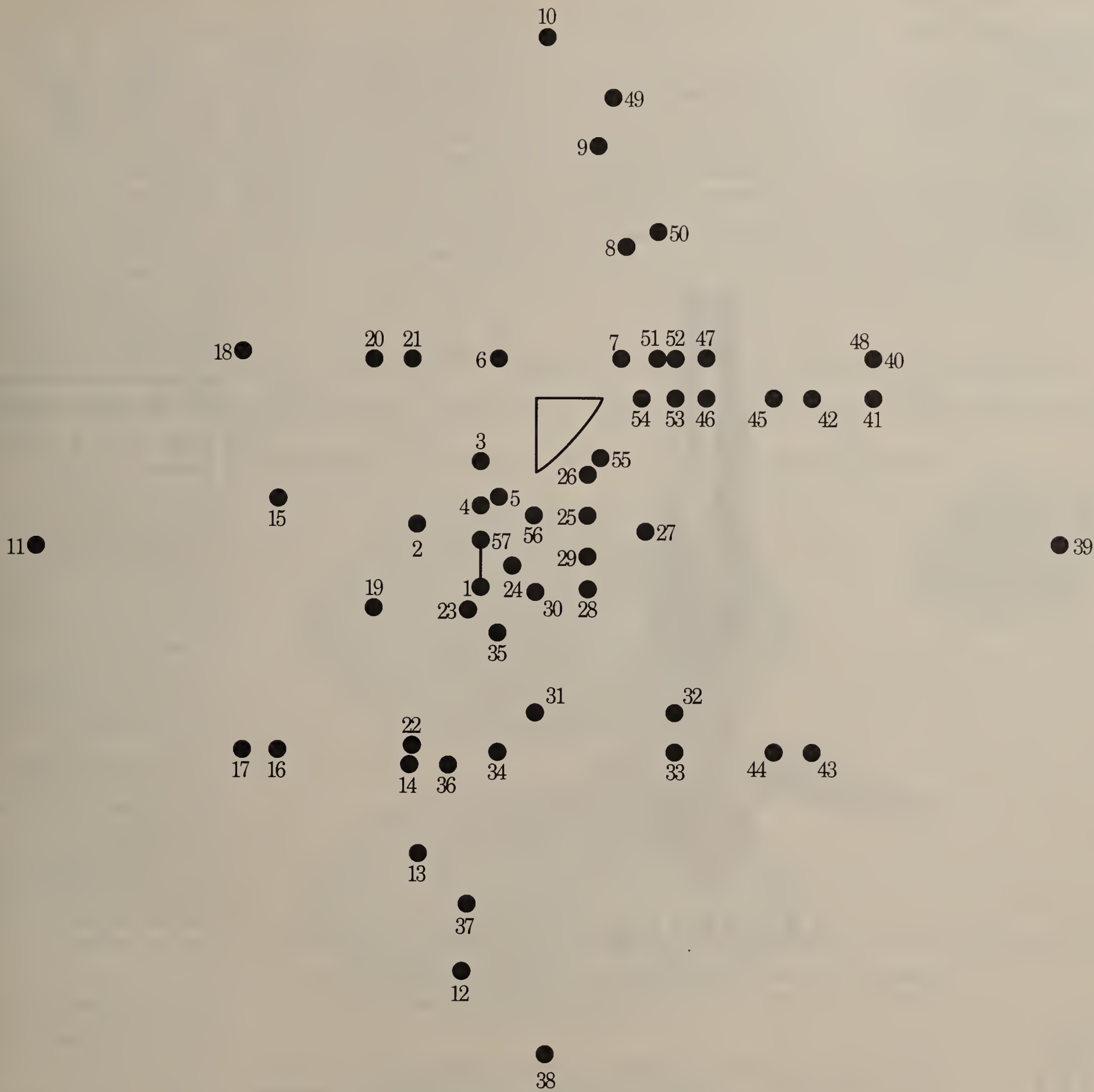
The FPX2000 is the high end of a product line that includes the FPX2195 frame relay access device, which was unveiled earlier this year. The FPX2195 is an eight-port concentrator for funneling synchronous and asynchronous data from remote sites to X.25 and frame relay networks.

Another product in the FPX line that debuted with the FPX2000 is the FPX4802/DES Frame Relay Encryption Device. This device provides security for public frame relay networks by encrypting data frames in accordance with National Bureau of Standards specifications.

The FPX4802 is available with an integral DSU/channel service unit (CSU) or a T-1 CSU. The T-1 CSU also allows a private branch exchange to share frame relay network access with the encrypted data, Cray said.

The FPX4802 is available now and is priced at \$6,995. □





## To Succeed In A Global Economy It's Important To Make The Right Connections.

To find out what's new at N.E.T., begin by placing your pencil on the number one. Ah, but it's far more than a new logo. It's a broadened vision of enterprise networking. One that places N.E.T. squarely at the forefront of the networking revolution. With products and technologies that will connect you desktop to desktop, down the hall and around the world.



NETWORK EQUIPMENT TECHNOLOGIES

[Just in case you can't  
draw a straight line.]



## Telematics rolls out its frame relay line

*continued from page 9*

which can be configured as 512K bit/sec trunks. The NFX 500 has 480 ports. It can handle up to eight frame relay trunk ports, each operating at T-1 speeds, and 472 local access ports.

For central office switching, Telematics will offer the NFX 7100, 7300 and 7500. The NFX 7100 can support 24 T-1/E-1 speed ports (1.544M bit/sec) and six T-2 ports, which operate at 6.312M bit/sec

each. The NFX 7300 supports 64 T-1/E-1 and 16 T-2 ports. The top end NFX 7500 supports 224 T-1/E-1 ports and 56 T-2 ports.

The NFX 7500 has an automatic redundancy feature, so if a shelf in the box fails, its data is automatically rerouted to a hot standby shelf.

Cattell said the firm has tested the NFX central office equipment with AT&T's Interspan, Westinghouse Communication, Inc.'s Westpac and BT's ExpressLane frame relay services. BT declined to comment on the new Telematics equipment,

and the other companies did not respond by press time.

Telematics will also offer an optional NFX Manager for configuration, performance and fault management of the NFX products. The NFX Manager software resides on a Sun Microsystems, Inc. SPARCstation running Unix. It features a color graphics display of the NFX net and lets users click on NFX icons to get more detail on any node. The NFX boxes also contain a Simple Network Management Protocol agent that will let them be managed by other SNMP managers.

Analysts said the NFX line's scalability and network management features are its strong points.

"Users tend to buy equipment on a pay-as-you-go basis, so the ability to buy more power as they need it will be a benefit to users," said John Donovan, a senior analyst with WorkGroup Technologies, Inc., a consultancy based in Hampton, N.H. "The products cover a broad range of prices that will fit many company's pocketbooks."

The NFX frame relay family is not Telematics first foray into the frame relay market. In 1991, the company made available the XCP board and frame relay software for its Net25 X.25 concentration product. XCP is still available, and Cattell said the firm would let users trade in existing XCPs for a corresponding NFX model. **■**



## BANDWIDTH

COMNET GIVES YOU THE JUMP ON FLEXIBLE SOLUTIONS THAT WILL SUPPORT THE NEEDS OF TOMORROW'S WANS

Figuring out how much bandwidth you'll need for next-generation applications isn't easy. Figuring out how to get it cheaply is likely to send you over the edge. Fortunately, there are solutions to both problems, and you'll find them at ComNet '93.

Look to the ComNet Conference for expert views on the impact of distributed applications on wide-area networking. Learn what you can expect from multimedia, who offers the best cost/benefit solutions for high-bandwidth applications, and when you'll see the cost of high-flying technologies like videoconferencing finally come down to earth.

The ComNet '93 Exhibit Hall puts your options where you can get a really good look at them. You'll find the latest offerings from over 450 manufacturers, including innovative new carrier services like switched T-1 and T-3, bandwidth-on-demand and public frame relay. Explore new product lines for inverse multiplexing, V.fast modems and many more. You'll see the most new products and the most complete product lines. And, as always, at ComNet you'll see them first.

Don't take unnecessary risks with your network. Plan now to be at ComNet '93. You can start by sending us the attached coupon for complete information and a FREE exhibits pass to ComNet '93.

**LIVENET**  
EXPERIENCE LEADING EDGE TECHNOLOGIES IN HIGH PERFORMANCE ENTERPRISE NETWORKING.

**GET FREE** ADMISSION TO OVER 450 EXHIBITING COMPANIES PLUS DETAILED INFORMATION ON ISSUES AND SOLUTIONS AT THE COMNET CONFERENCE, FEBRUARY 1-4, 1993, WASHINGTON D.C. **W6**

NAME/TITLE \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY/STATE/ZIP \_\_\_\_\_

MAIL TO: COMNET '93, P.O. Box 9107, FRAMINGHAM, MA 01701-9107

PHONE: 800-225-4698 OR FAX TO: 508-872-8237.

ANNIVERSARY  
**15**  
**COMNET**  
GET THERE FIRST

FEBRUARY

1-4, 1993

WASHINGTON, D.C.

ComNet™ is produced by World Expo Corp. and sponsored by Network World. LiveNet is sponsored by Computerworld.



**N**ot long ago, identical fossil types were discovered in South America and Africa. A rather curious unearthing, given that the two continents are noted today for their uniquely different species. To explain this finding, the naturalist Alfred Wegener correctly proposed the idea that long before our knuckle dragging ancestors made their foray onto the planet, Earth's continents had once been a single land mass that later split apart. What we are referring to, of course, is the theory of continental drift.

Although this most fantastic of Earth's mysteries may cause alarm for some people, it doesn't trouble us in the least. Because no matter how far apart the continents may drift, N.E.T.'s enterprise networks will make certain that they all stay connected. Easily, quickly and transparently.

## 200 Million Years Ago Earth's Continents Started Drifting Apart. Today, We're Working To Bring Them Back Together.

N.E.T. offers the world's widest range of networking products and technologies. Going beyond wide area networking, effectively linking local and wide area networks. And we have more ways to simplify network management, if you get our drift.

### OUR PLAN TO REUNITE THE CONTINENTS.

When it comes to movement, the Earth takes its sweet time.

We, on the other hand, prefer to move at a more rapid pace. Take our new Asynchronous Transfer Mode (ATM) product, for example. Developed through our ADAPTIVE subsidiary, ATMx tears down the barriers that exist between LANs and WANs. So you can connect desktop to desktop, down the hall and around the world.

Furthermore, it gives you the power to connect high performance workgroup data networks today and the ability to add

multimedia applications as you need them. That this technological accomplishment originates from

N.E.T. should come as no surprise. After all, ATMx has an impressive genealogy. From the broadband, high speed

networks of our STM, to the global

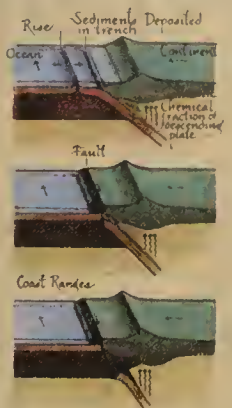
communication capabilities of IDNX, to the internetworking capabilities of our enterprise routers and frame relay modules. Not to mention the access networking capabilities you get from our ADN and SPX products.

By choosing N.E.T. as your networking partner, you get an incredible range of flexible networking solutions that can meet your objectives today and carry you into the future. Saving you a tremendous amount of time and money. Perhaps that is why N.E.T. has just swept the prestigious *Data Communications User's Choice* awards for outstanding technical capability and support.

### WHAT GOES AROUND COMES AROUND.

It seems that networking products bridging great distances may not be required 250 million years from now.

Scientists tell us that if present movements continue, the Atlantic and Indian Oceans will close up, drawing the continents together in a single immense land mass. Fascinating. But frankly, who can wait that long?



*While many set out to change the world, the real movers and shakers are the tectonic plates.*



*Millions of years ago, the continents were in a single mass called Pangaea. It eventually split and formed two smaller masses, Gondwanaland and Laurasia. Further splitting brought the continents to their present position. And you thought people had a hard time staying together.*



*We're tearing down the boundaries between LANs and WANs. Now you can connect desktop to desktop down the hall, and around the globe.*

Don't let opportunity drift by. Call 1-800-388-4NET for more information.





# HERE'S HOW OUR TOKEN RING PRODUCTS STACK UP TO THE COMPETITION'S.

Stack us up to any other major hub vendor, and see for yourself. Cabletron offers more Token Ring modules for the intelligent hub than the competition. Period.

But that's only the beginning.

Our Token Ring products are driven by Intel's high-performance i960 32-bit RISC processor. The competition's? 16 bits. Our active Token Ring modules provide up to 24 ports. The other guy's? Half that. And we have an integrated solution for bridging Ethernet, Token Ring and Wide Area Networks with a single module. Their solution? A stand-alone box.

Our products use Flash EEPROM for easy upgradeability. Theirs don't. Our Desktop Network Interface Cards support both STP and UTP and provide *at-a-glance* diagnostics. Theirs won't. And we've integrated twelve station ports on a single,

manageable repeater module with Ring-In/Ring-Out capabilities for both fiber and copper. They can't.

With 19 modules for our MMAC hub, Cabletron's Token Ring solution is "the complete solution." Theirs? Well, they simply don't stack up.

For more information on Cabletron's Complete Token Ring Solution, give us a call at (603) 332-9400, Ext. 2705. And ask for your free copy of Cabletron's *SNA and Token Ring Integration Strategy*, the white paper that maps out a smooth migration to the "new" SNA and integrated SNA/Token Ring environments.

*"To support new services to our subscribers, we at Blue Cross Blue Shield of Connecticut have embarked on an expansion project that will take us from 250 workstations to almost 2000! We found that Cabletron had the most complete line of Token Ring products and the technical support to assist us in designing and implementing the network that was right for us."*



Graham Morrison  
Network Design Engineering  
Blue Cross Blue Shield

**CABLETRON**  
systems Inc.  
Token Ring  
The Complete Networking Solution™













# LOCAL NETWORKING

LAN HARDWARE, NETWORK OPERATING SYSTEMS AND LAN MANAGEMENT

## Worth Noting

**“O**S/2 LAN Server is still a me-too product that has yet to catch up with the products it imitates.”

“Burton Group News Analysis”  
The Burton Group  
Salt Lake City

## Netnotes

**Unisys Corp.** this week is expected to announce two software-based security packages designed to provide security and data integrity throughout an enterprise net. The new products, CTOS Access Control and CTOS Availability, are both part of Unisys' CTOS InControl systems management software line for CTOS-based workstations.

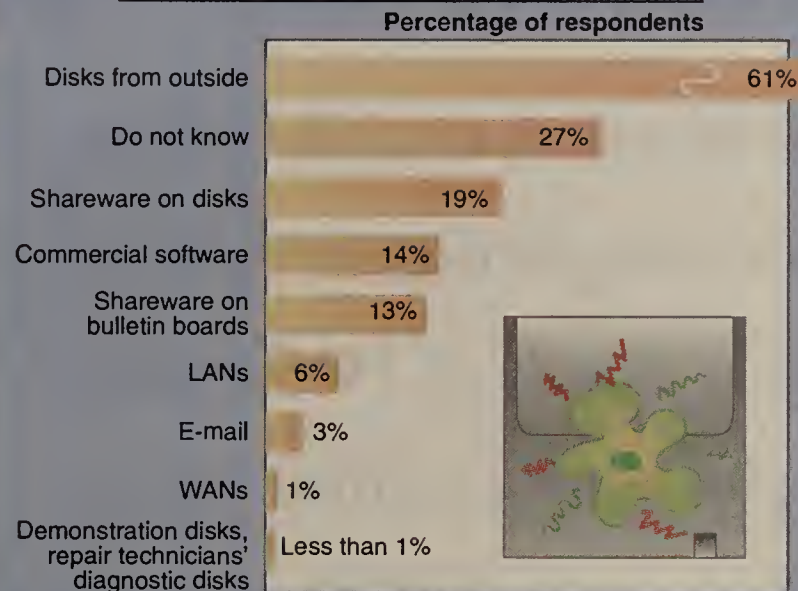
CTOS is a proprietary Unisys multitasking operating system that runs on its own workstations. It has built-in networking capabilities and can run DOS, Microsoft Corp. Windows and Unix applications simultaneously.

CTOS Access Control lets the net manager administer C2-level security throughout a CTOS network. It lets the administrator set up Access Control Lists, defining various levels of file access for different users as well as restricting access to certain network nodes.

CTOS Availability consists of two software packages, CTOS Data Availability Services (DAS) and CTOS System and Service Monitor (SSM). CTOS DAS provides on-line file backup and file monitoring capabilities, while CTOS SSM detects hardware and application software problems and, in some cases, initiates automatic corrective action.

All products will be available by the end of this year. CTOS Access Control will cost \$2,400 per CTOS cluster, CTOS DAS will cost \$1,250 per cluster, and CTOS SSM will cost \$750 per cluster. ■

## Where do viruses come from?



Results are based on answers from survey respondents who had experienced at least 1 virus infection on 1 or more computers.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: USA RESEARCH, INC., PORTLAND, ORE.

## Number of PC, Mac virus attacks expected to decline

Study says projection based on virus awareness.

By Caryn Gillooly  
Senior Editor

There is finally some good news on the virus front.

According to a study by USA Research, Inc., the number of virus infections attacking both personal computers and Apple Computer, Inc. Macintoshes is expected to decrease over the next few years.

While the number of virus-infected DOS-based PCs in the U.S.

pected to drop to a projected total of just over \$61 million next year.

The primary reason for the good news, according to the study, is virus awareness.

“These dramatic current and future decreases in virus infections or reinfections are *highly* dependent on the continued aggressive trends in antivirus education . . . and antivirus measures used by computer users and computer managers,” the study stated. “Without a strong antivirus response, the current and future number of computer virus infections or reinfections would be much higher.”

### An ounce of prevention

Viruses, however, have not disappeared, and firms should continue to implement prevention and detection methods.

Of the respondents that reported experiencing one or more viruses between 1989 and 1991, 64% said they detected them using antivirus software, according to the study. Of that 64%, 46% said they looked for a virus because of a system error, lock or crash; 27% received screen messages or graphic displays from the viruses; and 22% noticed a system slowdown.

Once infected, 88% of the respondents surveyed used antivirus software to recover from the infections.

For more information, contact USA Research in Portland, Ore., at (503) 274-6200. ■

**“T**hese decreases in infections are highly dependent on continued antivirus education.”



peaked at close to 1.2 million in 1991, that number is expected to drop to just over 50,000 next year.

Similarly, the number of Macintosh-based virus infections peaked at 275,000 in 1990, while that number is expected to decrease to just over 24,000 in 1993.

In bottom-line dollars and cents, the average damage incurred by viruses in the U.S. is just over \$800 per infected computer, peaking at a total of almost \$1.2 billion in 1991. That figure is ex-

## New offering forges mobile connections

Wireless product line based on infrared technology provides same networking capabilities as cable.

By Caryn Gillooly  
Senior Editor

SAN JOSE, Calif. — Photonics Corp. last week brought out the first product in a new wireless networking family that is designed to connect mobile users to one another and into wired LANs.

The product, called Collaborative PC, is part of Collaborate, the company's new family of wireless network products based on infrared technology. With Collaborate products, mobile computers can more easily be provided the same networking capabilities as those connected via cabling.

“We see this being used in three primary applications: groupware, connectivity from portable computers to the desktop and wireless access to an already wired network,” said Gary Hughes, president and chief executive officer at Photonics, based here.

The key to Collaborate is Photonics' Infrared Transceivers, which convert electrical information into pulses of infrared light and use this light as the medium for transmitting and receiving data. Information can be transmitted indoors within a 30-by-30-ft. area at 1M bit/sec. The signal

cannot penetrate walls.

Collaborative PC is an internal half-card for Industry Standard Architecture (ISA) or Extended ISA machines that supports attachment of the Photonics Infrared Transceiver to a personal computer.

Using Collaborative PC, portable users can exchange files and share printers with desktop PCs equipped with the same devices within standard local-area network environments, such as Novell, Inc.'s NetWare and Microsoft Corp.'s LAN Manager.

Although not announced yet, Photonics plans to extend its Collaborative family with a plug-in module for attaching to the parallel port of notebook computers, an adapter and tethered transceiver combination for Apple Computer, Inc.'s Macintosh desktop and PowerBook computers, a combination Personal Computer Memory Card International Association card and transceiver for small portable computers, and more.

Users should not expect to build full-fledged wireless LANs using Collaborate products. “We do not compete in the wireless (continued on page 62)

## DSS product prices down, power up

Network General's DSS line is a distributed version of its Sniffer network analyzer. It consists of a “server” on each network segment throughout the enterprise and a central SniffMaster Console, which collects information from the distributed servers.

Under the new price plan, the 386SX-based Sniffer Server for Ethernet costs from \$3,500 to \$6,995, depending on the management options selected. The previous prices ranged from \$4,995 to \$8,995. The token-ring version costs from \$4,500 to \$7,995, down from \$6,995 to \$10,995. The highest cut is on the SniffMaster Console, down from \$7,995 to \$4,995.

The 486SX-based products, which come with a full array of options and are available now, cost \$8,495 for the Sniffer Server for Ethernet and \$9,495 for the Sniffer Server for Token Ring. ■

MENLO PARK, Calif. — In an effort to fight the “high-price” stigma attached to its product line, Network General Corp. last week cut prices on its Distributed Sniffer System (DSS) products by as much as 38%.

The company also announced that its DSS server will now be available on an Intel Corp. 486SX-based machine in addition to the 386SX model, as it was previously. Plus, Network General is offering the higher powered model at a lower cost than a comparably configured version of its existing product.



# THE COMPAQ PROSIGNIA PC S THE SAME IMPACT AS OUR R

Not long ago, we introduced PCs that established us as the new leader in affordable computing. To that we now add the COMPAQ ProSignia Family of PC Servers: delivering a new level of performance, affordability and support by establishing a new class of PC servers.

Ironically, the more critical your PC network becomes, the more likely your network server will prove inadequate.

The faster you need something, the slower it delivers. When it's time to upgrade or expand, you find yourself at the technological equivalent of a dead-end street.

Which, needless to say, can be a problem.

What you need is an easy-to-manage system offering high performance, flexibility and extended

support. All at an exceptional price.

In other words, a breakthrough.

In still other words, the new COMPAQ ProSignia.

**PROCESSORS:** *chip upgradable 486/33 or 486DX2/66* **EXPANSION:** *7 32-Bit EISA bus master slots* **STORAGE:** *over 6GB internal in 8 bays* **HARD DRIVES:** *Fast-SCSI-2 (330MB, 550MB, 1.05GB), Drive Array Pairs (680MB, 1.02GB), IDE (210MB, 340MB, 510MB)* **DRIVE CONTROLLER:** *Integrated or optional 32-Bit Fast-SCSI-2, IDA-2, or Integrated IDE (on models 1/EL and 340/W)* **NETWORK CONTROLLER:** *Preinstalled 32-Bit NetFlex Controller* **SERVER MANAGEMENT:** *INSIGHT Server Management Framework* **RAM:** *4-128MB of industry-standard SIMMS* **WARRANTY:** *Free three-year, parts and labor, on-site\*\* warranty* **SUPPORT:** *Free 24-hour, 7-day hardware support, optional multi-vendor network operating system support.*

For starters, the COMPAQ ProSignia 486/33 outperforms comparably configured IBM and Dell servers by 83% and 64%, respectively.\* (Both of which, by the way, are much more expensive.)

In not-so-simple terms, here's how we did it:

COMPAQ ProSignia disk-configured models come standard with an all-new 32-Bit Fast-SCSI-2 Controller that performs twice as fast as old SCSI technology. As well as a preinstalled, COMPAQ 32-Bit NetFlex Controller that works with Ethernet or Token Ring. And for those who require truly



# SERVER. WE EXPECT IT TO HAVE RECENTLY INTRODUCED PCs.

extraordinary capabilities,  
we offer an optional 32-Bit  
IDA-2 Controller.

All of which means it  
takes a lot less time to get  
a lot more done. No more  
waiting for files. No  
more staring

blankly  
at a com-  
puter  
screen that  
stares just as  
blankly back.

The COMPAQ  
ProSignia is also the  
first affordable PC server  
incorporating advanced  
management technolo-  
gies. Included is a set of  
simple-to-use features  
that not only help you

maintain better control  
over your entire network,  
but can also anticipate,  
and help prevent, poten-  
tial problems.

The simple translation:  
Fewer headaches. For you.  
For users. Forever.

We've even turned

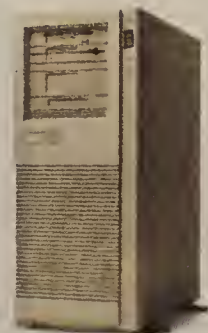
up the volume on our ser-  
vice and support program.  
You get a full three-year,  
on-site\*\*limited warranty,  
as well as 24-hour-a-day,

7-day-a-week technical  
support. Free.

CompaqCare also now  
includes our optional Ad-  
vanced Network Support  
Agreement, a comprehen-  
sive selection of systems-  
related support services  
that can be customized  
to meet your needs.

To learn how easy it  
is to get up and  
running, just call  
1-800-345-1518  
in the U.S., or  
1-800-263-5868  
in Canada.

You'll find out why  
the COMPAQ ProSignia  
represents such an excep-  
tional value. And why it  
will undoubtedly make a  
big impression. On the  
marketplace, and on you.



*The COMPAQ ProSignia starts at under \$2,700\* and is designed, tested and certified to run NetWare flawlessly. We even offer NetWare from Compaq to optimize server management capabilities.*



*With only industry-standard technologies and an easy-to-upgrade processor path, the COMPAQ ProSignia provides a cost-effective way to meet today's needs today. And tomorrow's tomorrow.*



by Contracted Service Providers, is specific to hardware products and may not be available in certain geographic locations. Consult the Compaq Customer Support Center for details. \*Suggested retail price; reseller price may vary; price indicated is for non-disk configured COMPAQ ProSignia 486/33 Model 11/EL, not pictured here; monitor, NetFlex Controller not included. Models including hard drive and NetFlex Controller start under \$4500. The Intel Inside logo is a registered trademark of Intel Corporation.



INTRODUCING  
The  
**NILE**



## How to make a 56/64 Kbps line carry four times its normal load.

Thinking of leasing an expensive new T-1? Think again. Introducing the Nile: A new multiprotocol bridge/router that can help you transmit four times more data on a 56/64 Kbps WAN link. And, Nile's unique Express Queuing™ software is guaranteed to reduce bottlenecks and improve response time on your line.

Powerful features such as Data Compression and Express Queuing are only part of what we call

"Bandwidth Optimization." You'll call them "How I increased network efficiency without spending a ton of money."

To learn more about increasing data line efficiency and reducing costs, call 1-800-444-7854. Ask for a free copy of *How to Optimize Your Bandwidth*. And find out how to move truckloads of data on your 56/64 Kbps lines.

A D V A N C E D C O M P U T E R C O M M U N I C A T I O N S



© 1992 Advanced Computer Communications. ACC is a registered trademark and Nile and Express Queuing are trademarks of Advanced Computer Communications. 315 Bollay Drive, Santa Barbara, CA 93117.



# INTERNETWORKS

LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

## Worth Noting

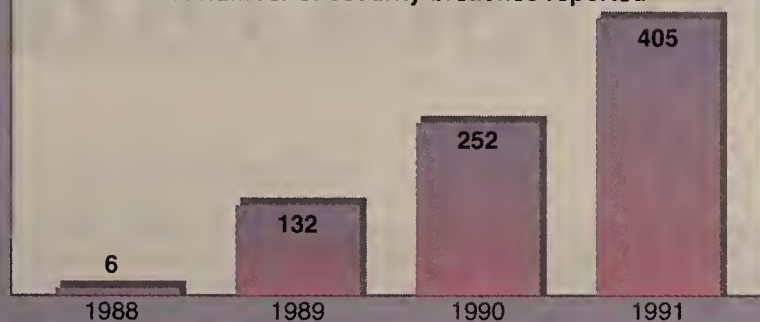
“**T**CP/IP was developed by the people, for the people. SNA, on the other hand, was developed by IBM, for IBM.”

**Guy Hoffman**  
Vice-president  
Eicon Technology Corp.  
Montreal

Speaking on the growing user migration from proprietary to standard protocols

## Internet security problems

Total number of security breaches reported



Despite the steep rise in security attacks on the Internet during the past 4 years, most users do not implement a security policy until after an intrusion occurs, according to the U.S. Department of Defense's Computer Emergency Response Team.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: CARNEGIE-MELLON UNIVERSITY, PITTSBURG

## DEC enhances connectivity options to non-DEC nets

New DECNIS 600 extends firm's multivendor reach.

**By Jim Duffy**  
Senior Editor

SAN FRANCISCO — Digital Equipment Corp. broadened its portfolio of multivendor interoperability offerings by unveiling a new version of its high-end router that supports popular LAN protocols.

At the same time, DEC padded its line of Fiber Distributed Data Interface connectivity products.

At the recent INTEROP 92 Fall show here, DEC announced Version 2 of its DECNIS 600 router. Version 2 allows the DECNIS 600 to funnel Novell, Inc. Internetwork Packet Exchange (IPX) and Apple Computer, Inc. AppleTalk packets through a DECNIS 600 backbone. DEC is encapsulating IPX and AppleTalk in the Internet Protocol to route them through a DECNIS backbone.

Version 2 also supports the Open Shortest Path First (OSPF) routing protocol for IP routing and the Routing Information Protocol, in addition to the Integrated Intermediate System to Intermediate System protocol.

The DECNIS 600 supports the Transmission Control Protocol/Internet Protocol, DECnet/Open Systems Interconnection and DECnet Phase IV. It provides local and remote bridging and X.25 gateway services. The router forwards 80,000 64-byte IP packets per second and 14,000 64-byte Ethernet packets per second.

Some of the new features piqued user interest. “We will be migrating to OSPF in the next year or two. DEC may be a player” in facilitating that migration with the DECNIS 600, said Phil Demar of the Fermi National Ac-

celerator Laboratories in Batavia, Ill.

### Other enhancements

Other new features bundled into Version 2 of the DECNIS 600 include support for the Point-to-Point Protocol (PPP) for interoperability with other PPP routers over serial lines and support for 2M bit/sec frame relay services. Version 2 marks DECNIS 600's initial support of frame relay.

Version 2 also supports DEC's Data Communications Message Protocol for interoperability with DECnet-only routers as well as compression and routing prioritization of DEC Local Area Transport packets.

Fully configured, DECNIS routers range in price from \$10,000 to \$50,000. DECNIS 600 Version 2.0, which includes PPP, AppleTalk and IPX support, will be available this month. Version 2.1, which supports OSPF, the Digital Data Communications Message Protocol and frame relay, will be available in January.

DEC also unveiled an FDDI card for the DECNIS 600 that will allow users to locally or remotely route and bridge traffic between 100M bit/sec FDDI local-area networks or between FDDI and Ethernet LANs.

The FDDI card — called the DEC FDDIcontroller 621 — supports single and dual attachment to an FDDI ring over single-mode or multimode fiber. It forwards 46,000 64-byte packet/sec.

The FDDIcontroller 621, which ranges in price from \$11,900 to \$15,500, will be available in November.

(continued on page 24)

## NSC/Vitalink unveils upgrades to 6600

Firm's line to support token-ring, WAN protocols; signs an interoperability agreement with DEC.

**By Maureen Molloy**  
Senior Writer

FREMONT, Calif. — Network Systems Corp. (NSC)/Vitalink has enhanced its 6600 line of bridge/routers to support token ring and several new wide-area network protocols, including frame relay, Switched Multimegabit Data Service (SMDS) and X.25.

The new two-port token-ring interface fits in the vendor's high-end 6400 and 6800 Reduced Instruction Set Computing-based bridge/routers, which have four or eight slots and support all LAN media as well as wide-area network interfaces up to T-1 speeds.

Besides the Transmission Control Protocol/Internet Protocol and Novell, Inc.'s Internetwork Packet Exchange (IPX) routing, the bridge/routers support the Routing Information Protocol, the Point-to-Point Protocol (PPP) and the vendor's proprietary Vitalink Communications Protocol (VCP).

In addition, the token-ring in-

terface supports IBM source routing and translation bridging among token-ring, Ethernet and Fiber Distributed Data Interface local-area networks.

Pricing for the bridge/router with the token-ring module starts at \$9,000 for base configurations — one token ring and one Ethernet or one token ring and one serial link — and ranges upward, depending on the combination of token-ring, Ethernet, FDDI or T-1 connections supported.

NSC/Vitalink additionally announced a software enhancement that enables the 6400 and 6800 to support frame relay, SMDS and X.25 WAN links at speeds up to T-1.

Both bridge/routers have been certified by frame relay service provider Witel and are still being evaluated by other carriers, while the Defense Data Network has certified the device's X.25 support.

Frame relay, SMDS and X.25 are now part of the standard software. (continued on page 24)

## Andrew Corp. unleashes a spate of new products

**By Maureen Molloy**  
Senior Writer

TORRANCE, Calif. — Andrew Corp. has rounded out its inter-networking offerings with the recent announcements of an Ethernet-to-token ring bridge, a remote router and a Windows-supported media management program.

The PathWise/7609 is a dual-port device that bridges traffic between Ethernets and 4M or 16M bit/sec token-ring LANs or between two similar local-area networks. It supports all the key bridging algorithms, including Ethernet's Spanning Tree Algorithm and token ring's source routing and can be managed from IBM's LAN Manager and NetView.

It costs \$5,595 and will be available in January.

The company also announced the PathWise/6000 series of re-

mote bridge/routers, which support both Ethernet and token-ring LANs, as well as wide-area connections over X.25, frame relay, fractional T-1 and T-1 nets.

The 6100 is equipped with one LAN and two WAN interfaces, while the 6200 will support three LANs or one LAN and four WAN connections.

Routing protocols supported on both include the Transmission Control Protocol/Internet Protocol, Novell, Inc.'s Internetwork Packet Exchange (IPX), Xerox Network Systems, DECnet and AppleTalk. The devices can be managed from any Simple Network Management Protocol-based net management station and supports in-band or out-of-band management.

Available now, the bridge/routers cost between \$5,500 and (continued on page 24)

## Link Notes

**Kalpana, Inc. and Sun Microsystems Computer Corp.**, a subsidiary of Sun Microsystems, Inc., last week announced an agreement to develop products that address network congestion problems found in Ethernet networks supporting large numbers of high-speed workstations.

The firms will integrate Kalpana's EtherSwitch technology with Sun's SPARC-servers so users can support more workstations on each Ethernet segment. Further details were not disclosed.

**Proteon, Inc.** announced two new products — the GNX 400 Gateway and DNX 300i router — that will let users better integrate IBM Systems Network Architecture traffic onto multiprotocol internets.

The GNX 400 is based on Proteon hardware and software from Netlink, Inc. and converts Synchronous Data Link Control traffic from devices such as cluster controllers into 802.2 Logical Link Control 2 data. Pricing starts at \$11,000.

The DNX 300i bridge/router can send SNA and non-SNA traffic across a multiprotocol backbone and supports both Ethernet and token ring, as well as frame relay, X.25 and T-1 links. Pricing starts at \$5,495. ■



# Our e-mail system lets you s of the most complex ne

At Lotus®, we have the solution for communicating across the vast network you see before you: *cc:Mail™*, the world's leading LAN-based electronic mail system.

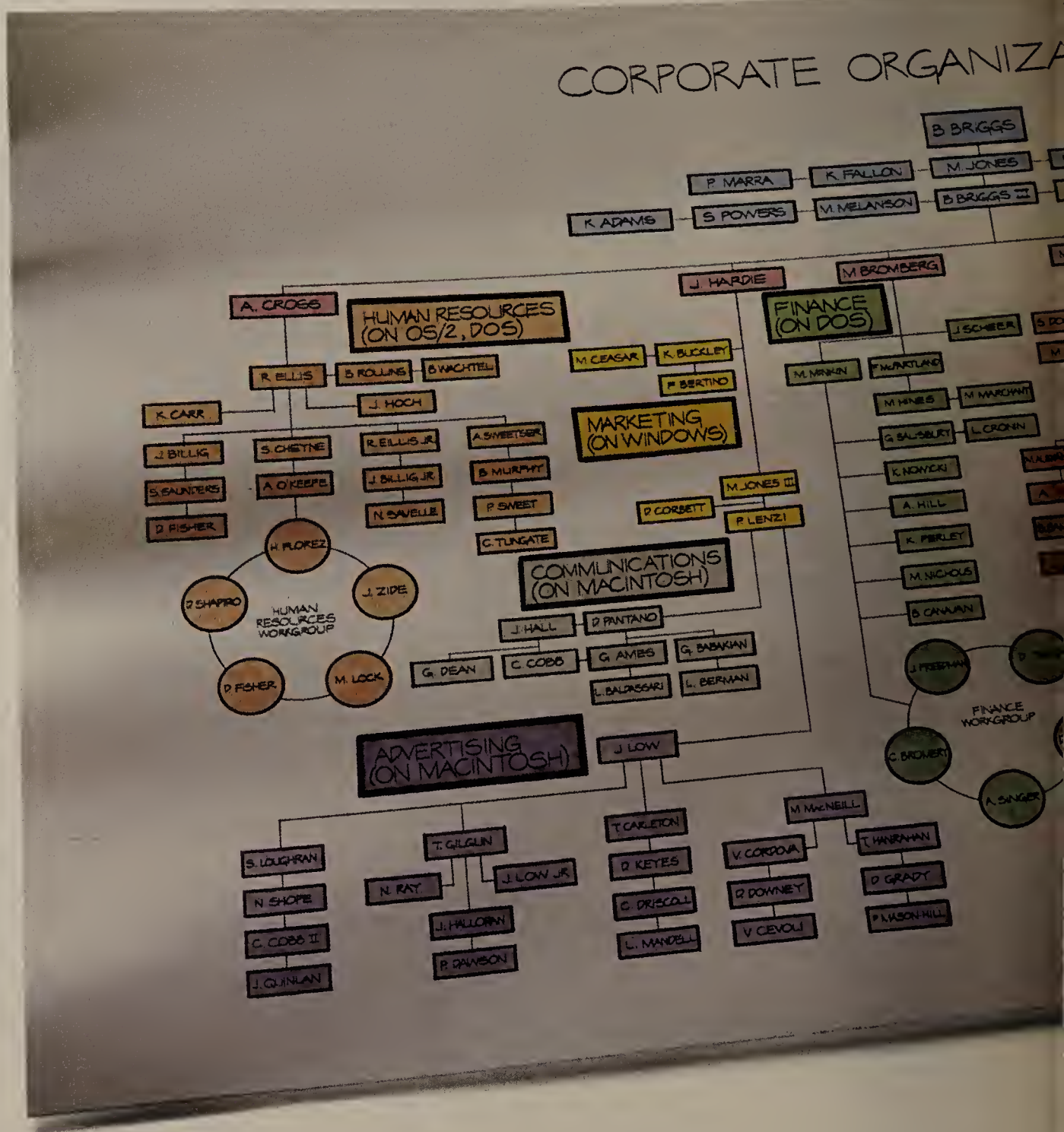
With cc:Mail, you'll have full connectivity and transparent cross-platform communication at every level of your organization. Our e-mail system was built from the ground up to support network environments of different platforms and LANS—without the need for gateways. So you don't have to worry about reaching the people you need to reach.

## A Mail System That Has All The Obstacles Licked.

Want to send text? Files? Graphics? Or Faxes? To Bob? Carol? Ted? Or Alice? With cc:Mail you can. Whether they're on the road or at home, whether they're on Macintosh®, DOS,

Windows™, OS/2® or UNIX®, whether they're on Banyan®, Novell®, LAN Manager or Appleshare, cc:Mail delivers.

Even if you want to send mail messages to private

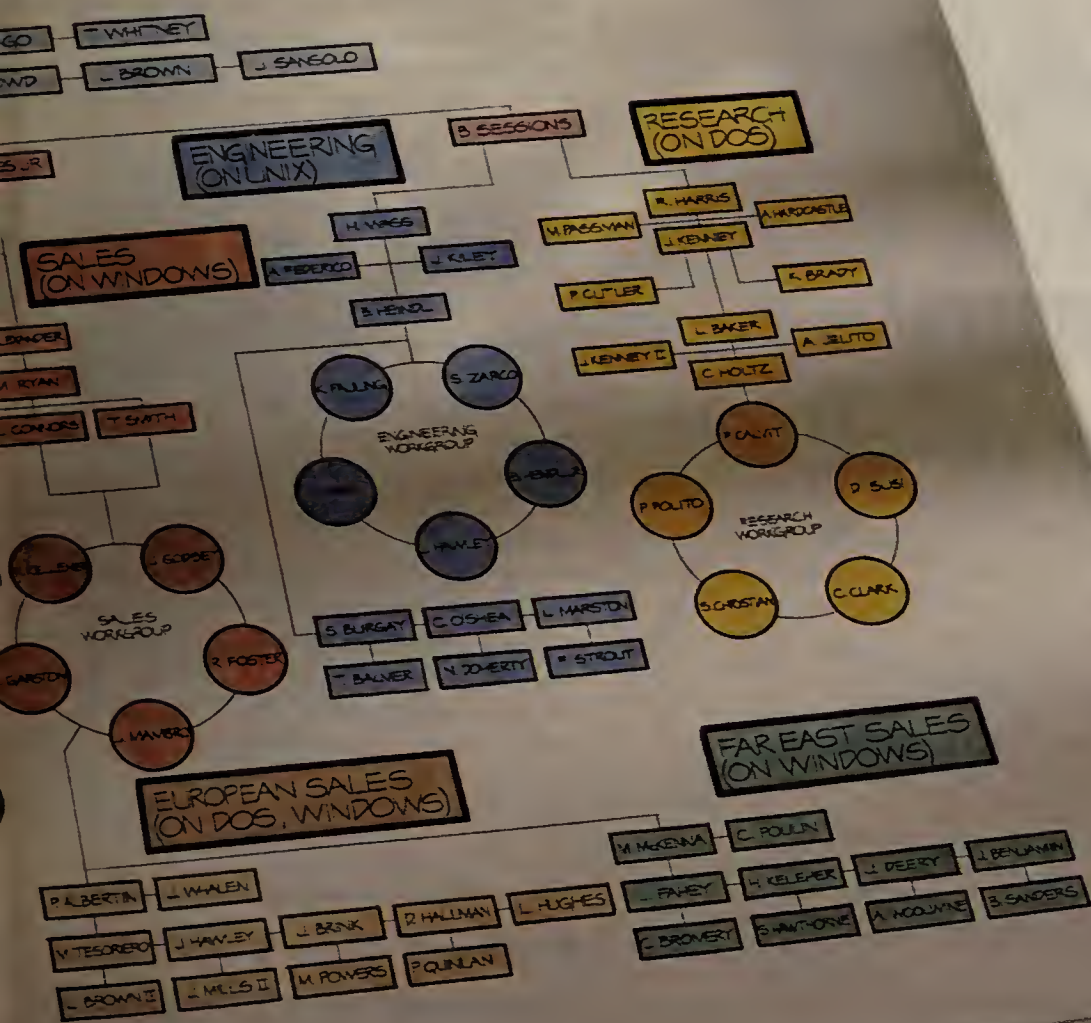


▲ What platforms does cc:Mail run on? A better question might be what platforms doesn't it run on.



# Send messages through one network known to man.

ON CHART



## A Mail System That Makes Life Easier.

You'll find cc:Mail easy to install, maintain and administer, thanks to time-saving tools like full user move, directory synch and reporting, and automatic backup.

You can also administer cc:Mail from any PC or Mac® on the network—something other e-mail

N. RAY,  
SALES MANAGER, SRI LANKA

▲ cc:Mail keeps everyone in the loop, even the person who's always out of it.

systems don't let you do. cc:Mail is built on a fully scalable architecture. Which means it can accommodate 5 to 500,000 users. And grow along with your business.

## A Mail System That Has Everyone's Stamp of Approval.

Over two million people from around the world already use award-winning cc:Mail. So if you're looking to standardize your e-mail system, you've come to the right place.

For a free demo disk of cc:Mail on the platform of your choice, **call 1-800-448-2500.** You'll find getting through to people at the office isn't so hard after all.

▲ With cc:Mail, you can send a message to anyone in your organization, no matter what network, platform, or continent they're working on.

and public e-mail systems, you can do so via cc:Mail gateways for IBM® PROFS®, MHS, X.400, MCI Mail®, SMTP, SoftSwitch, DEC® and others.

**Lotus** cc:Mail



## DEC enhances options to non-DEC nets

*continued from page 21*

Also on the FDDI front, DEC unwrapped single- and dual-attach Extended Industry Standard Architecture (EISA) bus FDDI adapters. The cards, called DEC FDDIcontroller/EISA, connect EISA-compliant i386 and i486 personal computers and workstations to an FDDI ring.

The single-attach card links the PCs to the ring through a concentrator, which also supports direct communications

among attached users, while the dual-attach card connects the desktop systems directly to the ring. The cards support drivers for DEC's Pathworks, Novell's NetWare and Microsoft Corp.'s LAN Manager network operating systems.

DEC seems to be the only large systems vendor still pumping out FDDI products as others scramble for the Asynchronous Transfer Mode (ATM) bandwagon. ATM, which fosters gigabit-speed LAN switching, is viewed by many as the successor to FDDI in the local area.

"There's no question that somewhere

down the road, there'll be space for ATM in the local area," said Lee Cooper, DEC's networks and communications marketing manager. "But FDDI's here today. If you need 100M bit/sec, we have a full product suite available."

The DECNIS 600 will provide ATM and Switched Multimegabit Data Service in the future, though DEC did not give a time frame. DEC also recently disclosed development of a hub that will eventually support ATM switching ("DEC serves up additions to its Ethernet hub," *NW*, Oct. 19).

Meanwhile, the vendor brought out a

new version of software for its DECconcentrator 500 FDDI hub. DECconcentrator 500 Software Microcode Version 3.2 supports the latest version of the ANSI station management standard for control of devices attached to an FDDI ring.

The FDDIcontroller/EISA for single attachment is priced at \$2,156 and will be available next month. The dual-attach controller is priced at \$3,506 and will also be available next month.

Version 3.2 of DECconcentrator 500 Software Microcode is priced at \$175 and is available this month. **■**

## NSC/Vitalink unveils upgrades to 6600

*continued from page 21*

ware for all 6600 platforms and are currently available as a free upgrade for existing 6600 customers.

In related news, NSC/Vitalink announced it has entered into an interoperability and cross-licensing agreement with Digital Equipment Corp. involving DEC's DECNIS 500 and 600 bridge/routers and Vitalink's 6000 Series of multiprotocol bridge/routers.

Under terms of the pact, Vitalink and DEC will implement the PPP data link protocol, the Open Shortest Path First routing protocol, Integrated Intermediate System to Intermediate System (IS-IS) routing for TCP/IP, Open Systems Interconnection and DECnet.

The agreement calls for DEC to license to NSC/Vitalink the source code for Integrated IS-IS routing. In addition, DEC will share with Vitalink its specification for DECnet routing over 802.5 token-ring LANs. The deal also provides DEC with licensing rights to the VCP. DEC will implement VCP in its DECNIS 500 and 600 routers. **■**

## Andrew unleashes spate of products

*continued from page 21*

\$9,000, depending upon configuration.

Finally, Andrew announced its MAUi/8700 Elite Media Management Program, management software that runs on a personal computer and enables users to manage Andrew's intelligent multistation access units (MAU) and IBM's 8228 MAUs.

The 8700 is equipped with a graphical user interface and can communicate through a token ring or an off-LAN connection to Andrew's MAUi/8500 and MAUi/8600 hubs and IBM MAUs. The program appears as an icon on a Windows screen that — when opened — offers displays, configuration control, status information, events and alarm logs, and download capability.

Multiple simultaneous front panels provide monitoring capabilities by displaying the front panels of any of the vendor's MAUi/8500 MAU Controllers, MAUi/8600 Intelligent Controller MAUs and MAUi/8508 Intelligent Satellite MAUs. Multiple front panels can be opened simultaneously, with each monitoring its appropriate device.

The new management program is available now. Pricing was not available at press time. **■**

# With *Network World*, you can make your next trip to the library without leaving your desk.

✓ Instant Fax-Back Information Now Available. Call 800.756.9430. When prompted, use code #20 for NetText™ or #25 for NetText™ OnLine.

*Network World* introduces NetText™, a comprehensive, fully searchable library of *Network World* articles available now for the first time on disk. Research has never been so easy, or complete.

For only \$129.95, your year-long subscription to NetText™ includes:

- *Network World's* detailed editorial from January 1991 through September 1992 with instant access to Buyer's Guides, Budget and Salary Surveys, Critical Issues Surveys and more.
- Quarterly update disks sent to you for one full year

Or, for just \$199.95, your subscription will include four full years of *Network World*, 1989-1992!

Based on the Folio® database engine, NetText™ is a full text retrieval product on DOS diskettes. Therefore, you can count on NetText™ to provide you with all the information you need to answer all of your enterprise networking research needs.

If your enterprise networking information needs are even more immediate, consider a subscription to NetText™ OnLine.

- Full text retrieval of *Network World* in a real-time, on-line environment.
- Instant access to the most comprehensive networking information on an on-demand basis.
- Weekly updates ensuring up-to-the-minute information and data.
- Just a local call from most locations.
- Available for DOS®, Windows®, or MAC® platforms.

Call today for your NetText™ OnLine start-up kit including easy-to-use communications software.

**NetText™**  
A library of *Network World* articles

**NetText™**  
A library of *Network World* articles  
**OnLine**

## For more information or to order call 800.643.4668 today.











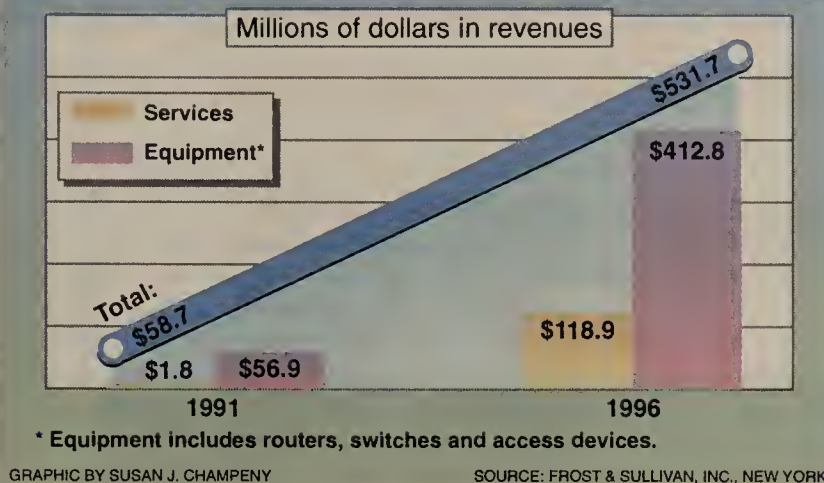
# GLOBAL SERVICES

DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

## Worth Noting

**P**acific Bell recorded roughly 100,000 minutes of use for its switched digital services in April, a figure that skyrocketed to seven million minutes by October.

## The burgeoning U.S. market for frame relay products and services



## AT&T on the defensive in private-line billing dispute

Denies using loophole to overcharge large users.

By Anita Taff  
Washington Bureau Chief

WASHINGTON, D.C. — AT&T last week strongly rebuffed charges from five large corporate users that complained to the FCC in September that the carrier is using a loophole in its private-line tariffs to overcharge them by \$1.5 million.

AT&T told the Federal Communications Commission in a formal response that the users' charges were completely unfounded and, in some instances, based on false information. The carrier asked the FCC, which has a year to act on the complaint, to throw it out.

The five customers that filed against AT&T are Charles Schwab and Company, Inc.; Japan Air Lines, American Region; Quotron Systems, Inc. (QSI); Texaco, Inc.; and TRW Information Systems Group, Credit Data Division. However, according to the complaint, any customer that purchases intra-local access and transport area private lines from AT&T's Tariff 11 could potentially be overcharged.

The customers claim that AT&T's Tariff 11, from which all users purchase private-line services, is so ambiguous that customers are unknowingly setting themselves up to be overcharged. In some instances, customers are needlessly paying two or three times what they should be, the complaint alleges.

The users claim AT&T's tariffs fail to state that the carrier can configure the circuit as a direct link between two customer sites

or route the circuit through an AT&T central office between the sites.

The problem, according to the users, is that routing a private line through AT&T's central office racks up double charges for circuits and adds new service charges for access and central office connections.

Unless users specifically request the least expensive configuration, AT&T chooses the most expensive route through its central office, the customers allege.

But last week, AT&T told the FCC the users were not telling the whole truth. AT&T said its tariff clearly explains provisioning options by stating that private-line services can be provided "between one or more customer premises and an AT&T central office."

In addition to that tariff language, AT&T insists it has made every effort to provide customers with such information on an individual basis.

Despite AT&T's explanation to the FCC, Hank Levine, the attorney representing the five users in their complaint, maintains that AT&T is wrong. He said that the tariff language quoted by AT&T does not apply to the point-to-point dedicated service purchased by the five users.

Additionally, he said that although AT&T personnel briefed users generally about Tariff 11, they failed to mention the configuration options available.

When Tariff 11 took effect, AT&T said it sent notices to customers  
(continued on page 28)

## Long-distance SMDS trial proves positive

AT&T, GTE, PacBell join on landmark testing; throughput, delay exceed users' expectations.

By Bob Wallace  
Senior Editor

SAN FRANCISCO — Pacific Bell, GTE Telephone Operations and AT&T last week detailed the findings of the industry's first long-distance Switched Multi-megabit Data Service (SMDS) field trial.

In the first-of-its-kind test, two Rockwell International Corp. sites using local SMDS service from Pacific Bell and GTE Telephone Operations were connected via AT&T long-haul SMDS links to the Numerical Aerodynamic Simulation (NAS) facility at the National Aeronautics and Space Administration's Ames Research Center here.

Pacific Bell and GTE Telephone Operations also connected their broadband research laboratories — in San Ramon and Marina Del Ray, Calif., respectively — to the test T-3 SMDS wide-area network.

Rockwell scientists used the system to visualize Computational Fluid Dynamics data using sim-

ulation programs running on a Cray Research, Inc. Y-MP supercomputer at NAS/NASA.

"During the test, we interchanged vendors' equipment, bashed protocols, banged away at security systems and scrutinized data as it raced across the state," said Diana Whitehead, assistant vice-president with Pacific Bell's Data Communications Group. "Then we turned it over to Rockwell and NAS/NASA to try with live applications."

Among the primary findings of the test were that throughput and round-trip delay from the local telephone companies to AT&T were well within tolerances, which pleased users.

Round-trip delay from NAS to Pacific Bell ranged from a low of 21 msec for a 64-byte packet to a high of 94 msec for a 1,514-byte packet, while delay from NAS to Rockwell ranged from a low of 31 msec to a high of 109 msec for the same sized packets.

Round-trip delay for NAS to  
(continued on page 28)

## 'Cookbook' for ISDN hits stands

By Ellen Messmer  
Senior Correspondent

GAITHERSBURG, Md. — The North American ISDN Users' Forum (NIUF) has delivered on a promise made last spring to create an "ISDN cookbook" to help users deploy the technology.

The book, *A Catalog of National ISDN Solutions for Selected NIUF Applications*, details 35 ways to implement 17 applications, including videoconferencing, telecommuting, file sharing and access to local-area networks and frame relay.

The 384-page catalog, offered for free through the National Institute of Standards and Technology (NIST), arrives just in time for the kickoff of the Transcontinental Integrated Services Digital

Network Project (TRIP) '92.

During the TRIP '92 nationwide celebration of ISDN next week, service and equipment suppliers will mark the transition to a version of ISDN called National ISDN that is intended to address carrier interoperability issues. More than 70 ISDN users will open their doors at 150 open houses throughout the country to demonstrate ISDN applications.

### National ISDN 1

The transition will arrive in phases, the first founded on the National ISDN 1 specification from Bell Communications Research for Basic Rate Interface (BRI). National ISDN 2, expected next year, will focus on the Primary Rate Interface. By 1995, equipment and switch vendors will support more advanced ISDN service features in National ISDN 3, which is now being formulated.

Although the NIUF's catalog contains some information on National ISDN 2, its focus is National ISDN 1. The catalog details  
(continued on page 28)

## Regulatory Update

According to a recently released report, 143 lawsuits are pending against the **Federal Communications Commission** in top federal courts countrywide. There are currently three suits pending in the U.S. Supreme Court, 128 pending in the U.S. Court of Appeals' District of Columbia Circuit and 12 pending in other U.S. Courts of Appeals.

The suits have been filed by users, state regulators, carriers or other industry groups that claim the FCC has mishandled a legal matter or reached an inappropriate decision in a ruling. The suits span the broad range of issues handled by the FCC, from broadcasting to telephone services.

Two of the cases before the Supreme Court are disputes over broadcasting licenses, and one is a complaint that the Cable Act is discriminatory.

Several cases in the Court of Appeals for the District of Columbia deal with telephone issues.

In a case filed by Illinois Bell Telephone Co., the regional Bell holding companies are challenging a 1990 FCC decision to reduce their rate of return on interstate access services to 11.25%. Another by the New York State Department of Law asks to set aside a deal struck between the FCC and Nynex Corp. to discontinue alleged overcharging by Nynex through a purchasing subsidiary. ■



# These Routers Won't Let Your Network Down

**No Single Point of Failure.** Ensure that your network stays up, even if a single component fails, with extensive hardware and software redundancy, as well as fault isolation and recovery capabilities.

**Unsurpassed Connectivity and Interoperability.** Create one seamless internetwork with support for every major LAN and WAN medium and protocol, including SNA.

**On-line Operational Servicing (Hot Swap).** Easily replace any hardware module without taking the router out of service.

**SNMP Node Management.** Configure, monitor and control the router from a remote PC or workstation with our windows-based Site Manager. It's as easy as "point and click."

**Industry-Leading Performance.** Minimize application response times with forwarding performance that scales to 480,000 pps. Our unique symmetric multi-processor architecture utilizes MC68040-based Fast Routing Engines and our 1 Gbps Parallel Packet Express.

**On-line Dynamic Reconfiguration.** Quickly change any configuration parameter without taking the router off-line or rebooting.

**Network Security.** Control access to networks, applications, servers and individual users easily and effectively using our Uniform Traffic Filters.

**Investment Protection.** Satisfy your growing network needs by adding software and hardware modules to our scalable systems, rather than buying new routers. Our commitment to standards ensures interoperability with other products, now and in the future.



Your company's success depends on how well your enterprise internetwork supports mission-critical applications. You need to keep your internetwork running all day, every day, no matter how much traffic it handles. Regardless of the number and type of protocols it has to support. Regardless of how often you must make configuration changes. And regardless of

unexpected malfunctions. That's why your internetwork needs the most technologically advanced routers ever developed – Wellfleet's Backbone Link and Concentrator Nodes. For more information and a free copy of Wellfleet's Router Evaluator, phone us at **1-800-448-3400, Ext. 511W.**

After all, you can't afford to choose a router that lets your network, or your company, down.



**When Your Networks Are Complex,  
Your Choice Is Simple.™**



# ENTERPRISE APPLICATIONS

CLIENT/SERVER AND ENABLING SOFTWARE: DISTRIBUTED DATABASE, MESSAGING, GROUPWARE AND IMAGING

## Worth Noting

“When people start sending messages through mobile computers, they will use the phone less but communicate more.”

**Glenn Kaufman**

Business development manager  
Portable Computing Group  
Lotus Development Corp.  
Cambridge, Mass.

## SunSoft extends ToolTalk to five new Unix systems

Goal is to provide nonplatform-dependent facility.

By Timothy O'Brien  
West Coast Bureau Chief

SAN FRANCISCO — SunSoft, Inc. recently announced that its ToolTalk communications software that is used to link applications across heterogeneous devices is now available for five new Unix platforms.

ToolTalk, designed to provide plug-and-play application integration, is a Unix-based message-level communications service that facilitates information sharing between different applications.

SunSoft is making ToolTalk available on Unix systems from Cray Research, Inc., Digital Equipment Corp., Hewlett-Packard Co., Silicon Graphics, Inc. and Integrgraph. It already runs on Sun Microsystems, Inc. workstations and scalable processor architecture-compatible computers.

“Our focus with ToolTalk is to provide a nonplatform-dependent message facility that allows disparate applications to commu-

nicate across a network,” said Steve Martino, director of Distributed Objects Everywhere product marketing at SunSoft, a Sun subsidiary.

With ToolTalk, applications communicate by exchanging messages. Developers determine what type of messages the application needs to receive and then lists these messages in the ToolTalk service.

As the application operates over the network, ToolTalk acts as the go-between for the different applications handling the associated messaging required for the interapplication communications.

Since ToolTalk — acting as a distributed network service — hides the underlying network details, an application's location on the net can remain transparent to the user.

To facilitate point-to-point or broadcast requirements, ToolTalk utilizes multicast messaging, which will allow applications to

(continued on page 28)

## Firm offers object-based apps tool

By Wayne Eckerson  
Senior Editor

GOLETA, Calif. — SmartStar Corp. last week announced a new object-oriented application development tool that minimizes the coding needed to build client/server programs and optimizes SQL queries to multiple, heterogeneous databases.

Version 1.0 of SmartStar Vision is geared to firms that have applications running on the X Window System and use the Open Software Foundation, Inc.'s Motif graphical user interface (GUI).

SmartStar Vision 1.0 supports X terminals, Microsoft Corp. Windows-based personal computers and Apple Computer, Inc. Macintosh client workstations running X server software. It also supports application servers running Sun Microsystems, Inc.'s SunOS and Digital Equipment Corp.'s Ul-

trix and VMS operating systems.

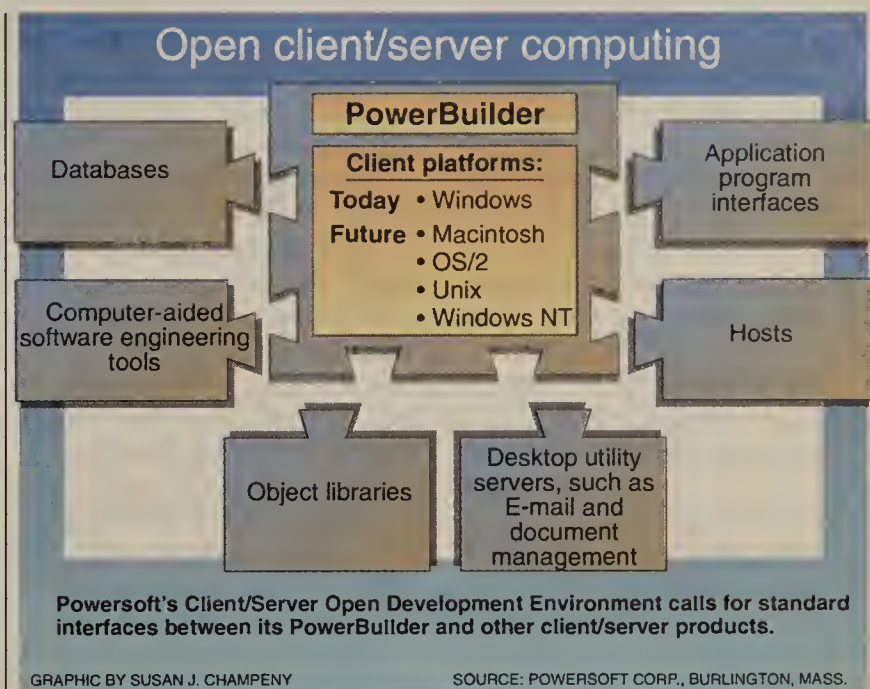
Future releases will support Windows and Macintosh clients without requiring the X server software, according to John Markel, president of SmartStar.

SmartStar Vision eliminates a lot of the routine coding needed to build SQL-based database applications. The software contains objects for building GUIs and complex SQL queries that let users present data in a variety of window styles, such as one record at a time (Rolodex style) or as columns of scrollable lines.

The objects contain methods that encapsulate all standard runtime SQL behavior as a function of the particular window style in the application. Thus, the objects manage such things as referential integrity, which validates data updated across SQL tables, and translations between different data-type structures.

In addition, SmartStar automatically handles standard SQL operations, such as INSERT, DELETE, UPDATE and SELECT commands. It also supports flexible queries, which allow end users to type qualifications to a query us-

(continued on page 28)



## Powersoft commits to open client/server

Also announces support for ODBC, Windows NT; expects to unveil Macintosh version soon.

By Wayne Eckerson  
Senior Editor

BURLINGTON, Mass. — Leveraging its strength as a rising star in the client/server market, Powersoft Corp. has challenged other vendors to publish application program interfaces (API) to their products.

In private briefings with analysts and reporters, Powersoft President David Littwack chided competitors for building client/server products that lock users into proprietary technologies. He called for all vendors to be “good client/server citizens” and publish APIs to their products.

“There is no single company in the client/server market that can monopolize a first-to-market leadership position and set de facto standards,” Littwack said. “Vendors, therefore, have the obligation to provide products that support common interfaces. The aim is to let users mix and match client, server and network products from different vendors to create a computing environment that best meets their needs.”

To reinforce its commitment to open client/server computing, Littwack unveiled Powersoft's new Client/Server Open Development Environment (CODE), a blueprint for increasing the market penetration and functionality of the firm's Windows-based client/server development tool, PowerBuilder.

Central to the CODE strategy

are standard APIs that will allow PowerBuilder to interoperate with other vendors' products and tools so that users can build robust client/server computing environments. Under CODE, Powersoft plans to establish relationships with a variety of vendors in order to build open links between their products and PowerBuilder.

Already, Powersoft has established relationships with two computer-aided software engineering (CASE) firms — LBMS, Inc. and Bachman Information Systems, Inc. (“CASE expertise comes to client/server development,” NW, Oct. 5). These partnerships will eventually allow users to use CASE analysis and design methods to develop objects that can be incorporated into PowerBuilder applications.

In upcoming months, Powersoft plans to forge similar ties with vendors of version control systems, terminal-emulation products, object libraries, desktop applications and desktop utility servers.

It also plans to add support for other client platforms besides Windows and Windows NT. Next week, Powersoft is expected to announce a relationship with Apple Computer, Inc. to develop a Macintosh version of PowerBuilder, sources said.

These partnerships will enable Powersoft to expand the scope of PowerBuilder as well as

(continued on page 28)

## Store & Forward

**Gupta Technologies, Inc.** is expected at Comdex/Fall next week to formally announce that its client/server database and tools will support Microsoft Corp.'s Windows NT operating system.

According to sources close to the company, Gupta is developing Windows NT versions of its SQLBase Server database, SQLWindows client/server application development software and Quest end-user front-end query tool. Gupta's support for Windows NT furthers its 32-bit multiplatform strategy, which currently includes support for Unix and IBM's OS/2.

**NCR Corp.** recently began shipping a suite of electronic mail products that enable companies to build enterprise-wide messaging backbones using Transmission Control Protocol/Internet Protocol and Open Systems Interconnection protocols.

NCR's StarPro Enterprise Messaging system supports X.400 messaging, X.500 directory services and gateways to local-area network E-mail systems. It also consists of user agents for DOS, Microsoft Corp. Windows, Open Software Foundation, Inc. Motif and Unix workstations developed by Enterprise Solutions, Ltd. and comarketed by NCR.

The suite starts at \$894 for a single-processor license. ■



## SMDS trial proves positive

*continued from page 25*

GTE Telephone Operations ranged from 30 msec for a 64-byte packet to a high of 100 msec for a 1,514-byte packet.

"The latency for data transmitted between switches that were 400 miles apart was 100 msec or less, which is very acceptable," said Steve Starliper, a director with Pacific Bell and president of the SMDS Interest Group. "It didn't cause time-outs in the applications, which was good."

Measurements of throughput and round-trip delay via T-1 lines demonstrated that the larger the packet, the more efficiently SMDS operates.

Cisco Systems, Inc. and Wellfleet Communications, Inc. routers and ADC Kentrox and Digital Link Corp. channel service unit/data service units were able to interoperate using the standard

Data Exchange Protocol and SMDS Interface Protocol. The test was also a proving ground for a new Hewlett-Packard Co./Idacom SMDS protocol analyzer.

In individual tests of routing protocols, including static routing, use of the Routing Information Protocol and the Open Shortest Path First protocol all performed successfully.

Researchers also attempted to "spoof" SMDS' access authorization system by submitting a valid source address from an unauthorized location and attempting to access an unauthorized source from an approved location. In both instances, the switch blocked unauthorized access.

Because of the growing number of Fiber Distributed Data Interface local-area networks, the ability of SMDS to encapsulate FDDI frames was field-tested.

"Theoretically, larger FDDI frames could be transmitted over SMDS," Starliper said. "But we

didn't actually know until the test if the routers could transmit the FDDI frames. The answer was that they could."

Lastly, NAS/NASA and Rockwell used the network for a variety of bandwidth-intensive file-transfer and imaging applications to evaluate the SMDS network against a pair of 56K bit/sec dedicated links.

"We found that in the perception of users, there was no difference between the two 56K links and the SMDS connection," said James McCabe, long-haul development subsystem manager for NAS/NASA. Applications were either distributed from the Cray supercomputer or required interaction among workstations on several LANs. The research showed that throughput met users' expectations.

McCabe said SMDS is a viable technology that provides users savings of more than 50% over dedicated T-1s. □

## SunSoft extends ToolTalk to Unix

*continued from page 27*

communicate with one or more applications simultaneously.

Since ToolTalk uses the Open Network Computing transport-independent remote procedure call, it can work with any network environment.

During the past year, more

than 50 vendors, including Lotus Development Corp. and Cadence Design Systems, Inc., have endorsed ToolTalk and will be making their applications compliant with it.

In addition, SunSoft is working with developers and end users to create standard message sets in the areas of desktop productivity, multimedia, databases and computer-aided software engi-

neering to enable applications from different vendors to be integrated.

SunSoft already ships ToolTalk communications software bundled with its Solaris 2.0 operating system. ToolTalk for Unix platforms from the other five vendors will be available in the fourth quarter. Pricing for ToolTalk on those platforms has not been released. □

## 'Cookbook' for ISDN hits stands

*continued from page 25*

116 products, such as ISDN terminal adapters and telephones, that either currently support ISDN 1 or will by next June.

The book shows dozens of diagrams with accompanying technical data for the equipment and service requirements for 17 BRI applications.

With its list of product names and prices, as well as customer contact points, the catalog also analyzes each product to determine if it supports V.120 subrate adaption, call features, National ISDN 1 and has the capability to split and combine B channels.

"I think both the users and service providers will benefit from it," said Stan Kluz, manager of the ISDN data network at the Lawrence Livermore National Laboratory and chairman of the California ISDN Users Group. He pointed out that telephone company sales forces often lack the requisite knowledge about ISDN, so the NIUF catalog should help educate vendors, too.

The catalog can be obtained by writing to the NIUF secretariat, c/o NIST, Building 223, Room B364, Gaithersburg, Md. 20899,

or calling (301) 975-2937 or faxing (301) 926-9675.

### Revving up ISDN 3

Although TRIP '92 is focusing attention on ISDN 1, Bellcore urged users at the NIUF's recent meeting to look forward and vote on the contents of National ISDN 3 so that switch and equipment vendors can implement the ISDN features users really want.

Based on suggestions already received by the NIUF, Bellcore has put together a list of about 50 feature candidates for inclusion in National ISDN 3. The technical work must be completed in 1993 for deployment by 1995.

In order to project demand, Bellcore and the NIUF are conducting a survey in which users are asked to vote for their top choices by Jan. 1.

Cost restraints and deadline considerations make it impossible for vendors to implement all the suggested features. Therefore, the survey asks users to vote for the top 20 features, ranking each in terms of importance.

The list of candidate features and the survey voting form can be obtained by faxing a request to Bellcore's Robin Russow at (908) 758-4506 or calling (908) 758-5588. □

## AT&T on the defensive

*continued from page 25*

tomers explaining how the new offering would change their private-line services. Additionally, AT&T said it explained the charges for the new Tariff 11 private-line services in each monthly bill for customers. The carrier said it also asked its account representatives to explain to customers how services would be provided under Tariff 11.

AT&T included an affidavit from Henry Jimenez, AT&T's account representative for QSI. Jimenez stated that in 1984 and 1985, he had several discussions with QSI, including a formal presentation to company executives about the new private-line tariff.

"Based on my interactions with QSI employees principally responsible for telecommunications matters between 1984 and 1987, it was clear that they understood the difference between the two types of routing and were keenly aware of the price differential," Jimenez said in his affidavit.

AT&T generally claims that all five customers were aware of the tariff's configuration options. □

## Firm offers object-based tool

*continued from page 27*

ing simple non-SQL syntax. This saves programmers from writing tens of thousands of lines of code and lets them concentrate on aspects of the applications that are unique to the end users' business.

SmartStar Vision offers a fourth-generation language, called SmartGL, that developers can use to build nonstandard elements in their SQL application.

Besides minimizing code, SmartStar Vision minimizes net bandwidth and processing time when joining data from multiple databases across a net.

SmartStar Vision's server portion has an SQL database query optimizer that determines at run-time the sequence in which databases will be accessed. It also lets users customize the query path by defining



John Markel

rules that specify which types of databases to access before others.

For example, users can specify that certain database tables with the fewest records be queried first before joining with data from other tables. This includes tables from the same database or different databases across a net.

"Our query optimizer at run-time determines which database should be accessed first to minimize net traffic and processing loads," Markel said.

Available now, SmartStar Vision has been beta-tested for several months by various companies, including TransAlta Utilities Corp. in Calgary, Alberta, and Arkwright Mutual Insurance Co. in Waltham, Mass.

The software costs \$12,000 and has a run-time license ranging from \$75 to \$600 per seat, depending on the number of users. □

## Powersoft opens client/server

*continued from page 27*

incorporate much of the functionality needed to build reliable, cost-efficient client/server applications.

Rather than build its own database, version control repository or transaction processing monitor, Powersoft will provide interfaces to existing products that are the best in their class in those areas, Littwack said.

He also said CODE is Powersoft's answer to the concerns of chief information officers who want to move to client/server computing but do not want to get locked into technologies that are proprietary or do not scale well to high-volume, mission-critical business applications.

### ODBC, Windows support

To underscore its commitment to open client/server computing and its CODE strategy, Powersoft also announced that the next version of PowerBuilder, due out in mid-1993, will support Microsoft Corp.'s Open Database Connectivity (ODBC) initiative and the Windows NT platform. ODBC is an open, call-level interface for accessing multiple databases across a network.

While PowerBuilder supports links to almost a dozen databases, ODBC will extend PowerBuilder's reach to many more, including Digital Equipment Corp.'s Rdb, Ingres Corp.'s database and IBM's SQL/400, Littwack said.

Andrew Mahon, a senior analyst at New Science Associates in Westport, Conn., said Powersoft's next step will likely be to establish partnerships with firms that have robust version control and configuration management tools, such as Intersolv, Inc. and Legent Corp.

These tools, when integrated with PowerBuilder, will enable users to establish a central repository for managing application objects.

### Playing catch-up

Other analysts view CODE as Powersoft's attempt to compensate for inherent weaknesses in PowerBuilder and freeze the market before Gupta Technologies, Inc. can announce its new version of SQLWindows 4.0, which is due out in the next two months.

Neal Hill, a consultant at Forrester Research, Inc. in Cambridge, Mass., said firms have used PowerBuilder successfully to build prototype client/server applications. However, it is unclear whether PowerBuilder will remain popular once companies try to advance their pilot projects to full-scale production.

"With PowerBuilder, it's easy to do easy things but hard to do difficult things like build high-volume transaction processing applications," Hill said.

He added that Gupta's SQLWindows 4.0 will incorporate version control features that users desperately need in order to implement client/server applications on a large scale. □



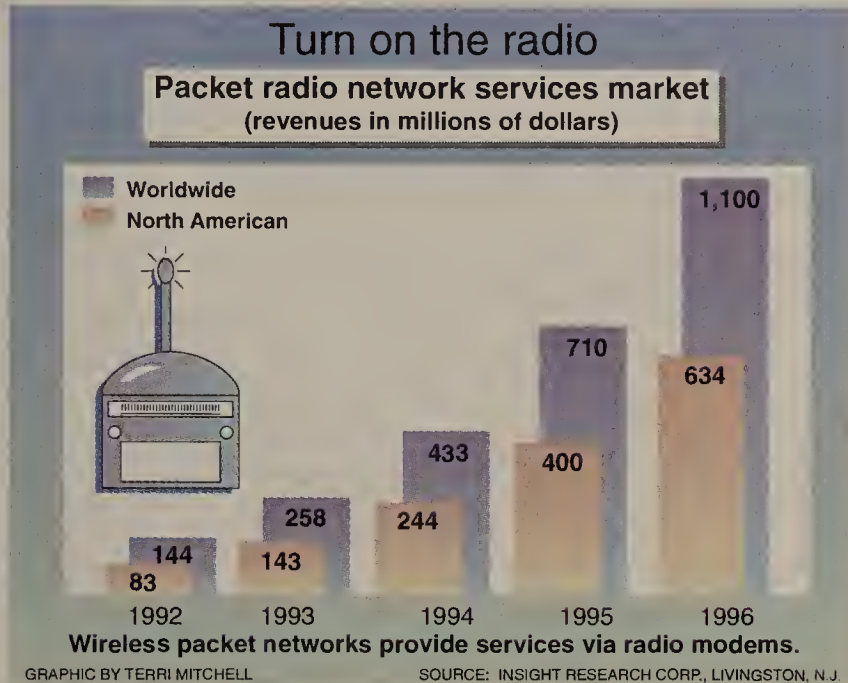
# INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

## Worth Noting

“If IBM doesn’t figure out how to provide and market straightforward client-to-DB2 access, many DB2 users will become ex-DB2 users. And that exodus will hurt IBM’s plans for using DB2 to support various IBM frameworks.”

Donald DePalma  
Senior analyst  
Forrester Research, Inc.  
Cambridge, Mass.



## RAM Mobile offers E-mail on its wireless network

Firm also details 6 new mail-related partnerships.

By Wayne Eckerson  
Senior Editor

SAN FRANCISCO — RAM Mobile Data has formally announced the availability of commercial E-mail and messaging services on its nationwide packet radio network, revving up the emerging wireless market.

The company also unveiled at the annual Electronic Mail Association conference here partnerships with six companies that will develop and market mail-enabled applications and E-mail services that utilize RAM Mobile Data's wireless network, including Lotus Development Corp. and WordPerfect Corp.

The new wireless messaging services are being marketed by RadioMail Corp. and Performance Systems International, Inc. (PSI), both of which announced codevelopment efforts with RAM Mobile Data earlier this year. The two firms have been pilot-testing services on the RAM Mobile Data network during the past several months.

RadioMail, formerly Anterior Technology, will use RAM Mobile Data's radio network to offer a two-way E-mail service between portable and hand-held computers as well as wire-based public and private E-mail systems, such as AT&T Mail, the Internet and Lotus' cc:Mail.

Likewise, PSI will offer a wireless E-mail gateway service that lets wireless personal computer users exchange messages with users on a wide range of public E-mail networks. Both firms will re-

sell RAM Mobile Data network services as part of their wireless E-mail offerings.

RAM Mobile Data's wireless network, which serves 50 U.S. cities, requires a radio modem called a Mobidem. A Mobidem weighs less than 1 pound and connects to laptops or PCs via an RS-232 port.

To help third-party vendors develop wireless messaging applications and services, RAM Mobile Data said last week that to shorten development, it is offering an application program interface to its MTP/1 message transport protocol, as well as software tools, application design guides and training programs.

Besides relationships with RadioMail and PSI, RAM Mobile Data is working with AT&T, Digital Equipment Corp. and Hewlett-Packard Co., all of which have agreed to add support for wireless communications to their E-mail products. Last week, RAM Mobile Data introduced six new partners that will develop wireless products for its network: AT&T EasyLink, Lotus, Simware, Inc., TEKnique, Inc., Telepartner International and WordPerfect.

Lotus, for example, plans to build drivers for cc:Mail E-mail software that will enable laptop users to utilize the RAM Mobile Data network, while Simware will provide software that gives users access to IBM's Professional Office System E-Mail, and AT&T EasyLink will provide software that lets AT&T Mail users exchange messages through the net. ■

## FCC asks users for dialing system input

Agency solicits ideas on revamping numbering system, including area codes, national numbers.

By Anita Taff  
Washington Bureau Chief

WASHINGTON, D.C. — The FCC has kicked off an inquiry into a massive overhaul of the way in which telephone numbers are assigned in North America, a change that may have a substantial impact on users.

The current 10-digit dialing system used in the U.S., Canada and the Caribbean has serious limitations that keep carriers and users from being able to support all the applications they would like, according to many experts. Their concerns range from a lack of area codes to support new traffic to the inadequacy of assigning telephone numbers according to a geographic location for new wireless services.

The Federal Communications Commission late last month opened an inquiry giving users, carriers and other interested parties 60 days to offer suggestions for revamping the administration and management of the numbering system.

Until now, decisions on telephone numbering have been made by the local and long-distance carriers, with little input from users, even though any major change in the system could have an impact on users.

“User concerns have often been overlooked or ignored,” said Lee Selwyn, president of Economics and Technology, Inc., a consulting firm in Boston. Changes being contemplated by the FCC and the carriers “pose a serious threat of creating customer confusion,” he said at a recent conference on numbering problems sponsored by Telestrategies, Inc.

### Area code crisis

The most pressing problem facing the industry is the exhaustion of area codes. Population growth coupled with skyrocketing network usage has dried up the pool of 144 available area codes, with none left that can be assigned, according to Ron Conners, director of the North American Numbering Plan Administration at Bell Communications Research.

Bellcore voluntarily administers the numbering plan at the behest of the FCC.

At the Telestrategies conference, Conners outlined a plan Bellcore has approved to add 640 new area codes in North America. Currently, the second digit of the three-digit area code must be either a one or a zero. This restriction would be lifted and second digits from two through nine will be allowed, opening up 640 more usable combinations.

A problem with that plan is that the entire framework for routing telephone numbers depends on the special pattern of an area code. Since the second digit can only be a one or zero, switches can distinguish between area codes on long-distance calls and the first three digits of a local telephone number, known as the central office code. Central office codes can have any number as the second digit.

### Massive effort

Carriers must now undertake the massive effort of reprogramming all their switches to handle the new area codes. Additionally, users will probably have to do some reprogramming of private branch exchanges and other equipment capable of dialing.

In addition to the area code changes, the industry is also poised to make important decisions about other major numbering issues. For example, many national corporations would like to have a single seven-digit number that customers all over the country could call.

However, obtaining such a number is almost impossible, according to Kelly Daniels, founder of Telco Planning, Inc., a consulting firm in Tualatin, Ore.

Only a few number combinations — such as 976, 555 and 520 — were set aside by all Bell companies from the outset of the numbering plan for diagnostic or other applications. Bell companies are allowing customers to use these numbers in some instances for national dialing. However, there is a limit to how many users might employ those numbers for national dialing. ■

## People & Positions

Dewaine Osman, a past executive at both Unisys Corp. and its former Timeplex, Inc. subsidiary, has rejoined Unisys as vice-president of corporate planning. Osman will be responsible for the strategic planning process at Unisys and will report to the company's chairman and chief executive officer, James Unruh.

Osman was president of Timeplex when it was sold to Ascom Holding A.G. in September 1991 and remained in that position until earlier this year when a new president was named.

Coral Network Corp., a network switch vendor in Marlborough, Mass., has named Robert Machlin as vice-president of marketing. Machlin, formerly Amnet, Inc.'s vice-president of marketing, will be responsible for all marketing activities at Coral. The company also named John Dowling, formerly with Epoch Systems, Inc., to the newly created position of vice-president of operations. He will be responsible for both customer service and manufacturing operations. ■





February 25, 1990 - A Pro-Reform demonstration in Moscow marks the final days of a 70-year quest for freedom.

# LET'S SAY THE PEOPLE ARE YOUR EMPLOYEES, THE CRY IS FOR FREEDOM AND THE WAY OUT IS YOUR GATEWAY.

It goes without saying, then, that the solution would have to be revolutionary. Because you can't afford to buy a new gateway every time you want to tie another PC operating system onto your LAN.

Enter the DCA®/Microsoft® Select™ Communications Server. It supports Windows™, OS/2® and DOS clients over LAN Manager and LAN Server. It's even open to third-party Windows and OS/2 emulators.

Enter, also, IRMALAN™/EP. It was the world's first gateway with LAN-to-host connections for Windows, Mac® and DOS clients over NetBIOS, Novell's IPX/SPX and AppleTalk®.

Both gateways support DFT, SDLC and token-ring connections, and Select supports X.25. And when you

combine IRMALAN/EP or Select and their clients with our recently introduced Remote LAN Node™, you can now perform remote dial-up terminal emulation, as well as remote network monitoring and management. Naturally, they're all

backed by the DCA Advantage™ support and migration program — the ultimate way to protect your investment.



**THE FIRST LAN-TO-HOST GATEWAYS  
THAT SUPPORT WINDOWS, DOS,  
MAC, OS/2...AND GLASNOST.**



*THE FREEDOM  
TO COMMUNICATE.*

# DCA

It's another reason more and more people are turning to DCA for the freedom to communicate. Call **1-800-348-3221, ext. 12R\*** for your free demo disk of Select, IRMALAN/EP or RLN.™

Open the floodgates of freedom and productivity. Call today.

\*Or call (404) 475-8880 if outside the U.S. © 1992 Digital Communications Associates, Inc. All rights reserved. DCA is a registered trademark and IRMALAN, Select and DCA Advantage are trademarks of Digital Communications Associates, Inc. Remote LAN Node and RLN are trademarks of Intercomputer Communications Corp. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. All other brand and product names are trademarks or registered trademarks of their respective owners.

SEE US AT COMDEX BOOTH # 4206



# MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

## Worth Noting

“We haven’t yet had the colossal break-in where somebody gets into a life-critical system and kills people or billions of dollars disappear as a result of some fraud. But you will see major things like that. You will see the Bhopals and Chernobyls of computer security.”

**Peter Neumann**  
Principal scientist  
SRI International  
Menlo Park, Calif.

## Manager Minutes

The **National Institute of Standards and Technology (NIST)** will conduct a Procurement Symposium on Dec. 7 in Gaithersburg, Md., to discuss user issues related to buying products conforming to the Government Open Systems Interconnection Profile requirements.

For more information, contact NIST’s public affairs division at (301) 975-3883.

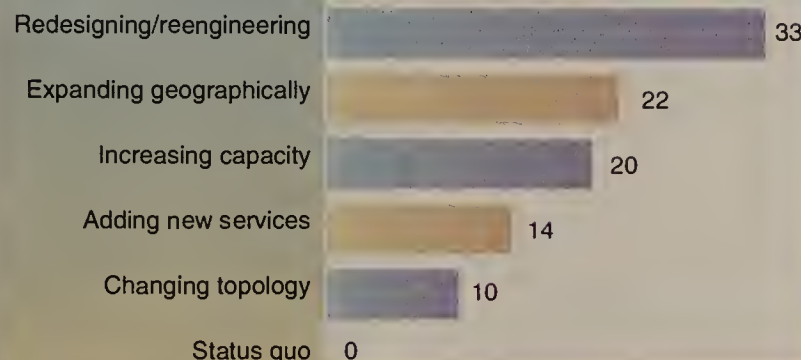
**Ferris Networks** and **Network World** are sponsoring a three-day seminar titled **PC Networks: The Strategic View Dec. 2-4** in San Francisco and Jan. 27-29 in Boston.

The seminar will be conducted by David Ferris, president of Ferris Networks and a regular contributor to *Network World*. Ferris will examine aspects of personal computer nets such as distributed databases, electronic mail, directory services, wide-area networks, speed, support and network management.

The seminar costs \$1,195. For more information, contact (415) 986-1414. ■

## Reengineering shapes users’ network plans

Of the following scenarios, one-third of the net managers surveyed said redesigning/reengineering best described their network changes planned in the next 5 years.



Figures are based on a survey of 99 network managers.

GRAPHIC BY TERRI MITCHELL

SOURCE: THE YANKEE GROUP, BOSTON

## HDI forms 100-member research, support group

Board to focus on building, maintaining desks.

**By Joanne Cummings**  
Senior Writer

COLORADO SPRINGS — The Help Desk Institute (HDI) is forming a 100-member research board to finance specialized help desk and technical support research.

The HDI 100, comprising technical support professionals in major corporations in the U.S. and Canada, will fund and direct a minimum of five major research projects per year designed to help the members of the group cost-effectively build and main-

tain their corporate help desks.

“Because of the technology explosion, help desks have become a strategic requirement for major enterprises,” said Mark Nentzow, director of research at HDI. “Help desk managers urgently need solid information to manage their rapidly growing and changing operations.”

The first HDI 100 research project will get under way this month. Some topics being considered are building a help desk employee staffing model to discover

(continued on page 34)

## Help desk frees up veteran IS staffers

Blue Cross of Minnesota’s move to Netman and LAN tool helps it boost customer approval rating.

**By Joanne Cummings**  
Senior Writer

EAGAN, Minn. — The information systems (IS) department at Blue Cross and Blue Shield of Minnesota is hoping that a new help desk system and a link to its mainframe-based problem tracking software will free up its more seasoned staff and boost its internal customer satisfaction rating.

The company had been using Computer Associates International, Inc.’s Netman, a mainframe-based problem tracking tool, to field and track the 200 to 250 calls its IS department handles each day. But it decided an easy-to-use local-area network-based tool that could be linked with Netman would enable it to staff its help desk with less experienced personnel, leaving veteran staffers available to handle only the most difficult problems using Netman.

The decision to move to the help desk was necessary due to the IS department’s low satisfaction rating among users.

According to Mark Trisko, manager of the customer assistance center at Blue Cross and

Blue Shield here, before the group started the help desk a year ago, only 40% of its users were satisfied with the service provided by the IS department.

“If a user had a problem with a password or something, they would most often call the people that were supporting their application,” Trisko said. “Then the application people would call down to operations, and operations would try to fix the problem. It just wasn’t a direct connection.”

After the help desk was in place for just six months, Trisko said the satisfaction rate jumped to 70%. Now he’s pushing to do better.

“Customer satisfaction of 70% is nothing to write home about; it’s still not very good,” he said. “But it is a big improvement, and it’s bound to get better.”

Now the agents are able to solve 40% of the problems they encounter on the first call.

“It’s a good trade-off for us,” Trisko said. “Instead of a person who’s earning \$45,000 a year

(continued on page 34)

## MANAGEMENT INSIGHTS

BY ERIC SCHMALL

## The network manager as a public figure

All net managers serve as public figures for their organizations. This gives them a unique opportunity to establish a departmental persona, something that can best be achieved through communications with the user public at large.

Network managers are responsible for providing the communications group with a human, rather than a technocratic, face. In every written or oral statement you make to the user community, you have a chance to provide a definitive tone and character for the department.

You are certain to alienate your reader if you lace memos with techno-babble. Consider this notice to a user group informing them of a scheduled

outage: “Plans have been made to schedule the voice mail system for third-quarter maintenance in accordance with the agreed periodic procedures. Work will be performed on the system from 11 p.m. Friday night until 6 a.m. Saturday. Users are advised to erase all stored messages in as much as the disk storage systems will be scanned for aberrations that could lead to irretrievable data losses.”

While this message gets the essentials across, it also creates an aura of cold technocrats dictating to the user community.

Think how differently the users might react if the same information were recast in a different tone: “Another in a series of preventative maintenance checks of our



voice mail system is scheduled for this Friday beginning at 11 p.m. and concluding by 6 a.m. Saturday. This work will help us ensure that the system will continue to be reliable.

“During this maintenance process, the system will not be available for use. While we don’t expect any problems in checking such things as system storage, we want to remind you that it’s a good idea to clear out all the messages you’ve stored in the unlikely event that they be accidentally erased.”

In this second example, the material is the same, but there are several important changes.

The tone makes the news (and the author) more approachable. Gone is the oppression (continued on page 34)





*From the bottom up, the PS/2 family of servers offers a diverse range of choices and an extensive array of features and options.*

# Not every server can be a PS/2.

Our newest PS/2® servers will stay alive and kicking. Even when others are dead and gone. The PS/2 line of servers delivers industry-leading performance and reliability that's hard to beat. So when you turn up the heat, they really cook.

For growing file and print server environments, the affordable new PS/2 Server 85 gives you a lot to look forward to.\* Its powerful 486 SX 33 MHz processor is upgradable to 66 MHz, and hardfiles can grow to 3.2GB under the covers.

For advanced file/database server needs, the Server 95 XP 486 series offers two high-performance models. One cranks out 486 DX2 50/25 MHz power. The other is a high-availability 486 DX 50 MHz server with 40MB data streaming for great performance and ECC memory for superior reliability. It provides fast response with a PS/2 3515 High Performance Disk Subsystem. Our 3514 High Availability Disk Array brings the reliability of RAID5 technology to any new PS/2 server.

At the very top of our line sits the new Server 295. This mission-critical, 486 DX/33 or 50 MHz multiprocessing powerhouse is hard to find fault with. It combines advanced fault tolerance and

\*Sale or delivery of the IBM PS/2 Server 85 is subject to FCC approval. \*\*Server 295 does not presently support NetWare. \*\*\*The three-year on-site warranty, four-hour average response time, setup, usage and service assistance apply only to all newly announced IBM PS/2 machine types. \*When serviced by IBM or IBM Authorized Personal Systems Servicers. Available Monday-Friday, 8 a.m. to 5 p.m. in your time zone. \*\*In Canada, call 1 800 465-7999. IBM, PS/2, Micro Channel and OS/2 are registered trademarks and HelpWare and HelpCenter are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. Novell and NetWare are registered trademarks of Novell Corp. COMPAQ is a registered trademark of Compaq Computer Corporation. DELL is a trademark of Dell Computer Corporation. ©1992 IBM Corp.





# Though many have died trying.

sophisticated system management for enterprise computing with personal system flexibility.

All new PS/2 servers feature advanced Micro Channel® architecture and will support OS/2®,  
The HelpWare Advantage.

Feature	DELL™ Performance Series	COMPAQ®	PS/2***
Warranty	1 Year	1 Year	3 Years
Service Response Time	Next Business Day	Second Business Day	4-Hour Average†
800# Assistance	7 Days/18 Hours	5 Days/12 Hours	7 Days/24 Hours
Trade-in Program	No	No	Yes
Licensed Education Centers	No	No	Yes
30-Day Money-Back Guarantee	Yes	No	Yes

Source: Dataquest Ledgeway, 7/92.

Windows,™ Novell® NetWare® and other operating systems.\*\* And they're all backed by HelpWare,™ a range of service and support that crushes the competition with a three-year on-site warranty, 24-hour-a-day/seven-day-a-week assistance and more.

We know you expect a lot out of a server. That's why we put so much in ours. After all, the last thing you need is for your network to not work. For more information or an IBM authorized dealer near you, call our Personal Systems Help Center™ at 1 800 772-2227.††



## HDI forms research and support group

*continued from page 31*

the typical and optimum ratio of support personnel to end users; developing a technology trends model to forecast which technologies will have the most impact on the help desk environment; and developing a cost model that will enable managers to take into account the costs of building a help desk, including hidden costs such as user competence and training levels.

"The research results will provide

members with customized models for site-specific help desk operations and will give them expensive, specialized research for a fraction of the cost," Nemtzw said.

The results of the research will be reported and discussed at semiannual membership meetings. Future research topics will also be selected at that time.

Becoming a member of the HDI 100 costs \$10,000 per year, but member companies that join before Dec. 31 will pay only \$8,500.

For more information, contact HDI at (719) 531-5138. **Z**

## Help desk frees up veteran IS staffers

*continued from page 31*

talking on the phone two hours a day, we have a person who's only earning \$20,000 a year taking the calls."

The insurer is currently utilizing Software Artistry, Inc.'s Expert Advisor help desk system, a knowledge-based tool whose capabilities the company is only beginning to tap.

Trisko said his company chose Expert Advisor, which runs on a Novell, Inc. Net-

Ware LAN, for a variety of reasons.

"First, it had to be LAN-based," he said. "The majority of our problems are mainframe-related, and we wanted to make sure that we had a system that was available when the mainframe wasn't."

In addition, it needed to be easy to use and have an intuitive graphical user interface. A variety of products fit those criteria, but the help desk system also had to be easily linked with Netman.

At no charge, Software Artistry agreed to work with Blue Cross and Blue Shield to develop the bidirectional link between Expert Advisor and Netman. In fact, as a direct result of that collaboration, Software Artistry is now making generally available a generic mainframe interface for Expert Advisor.

"It was an advantage to both of us," Trisko said. "It didn't cost us extra, and they eventually ended up with an add-on product to Expert Advisor that they could market."

Through the link, Netman and Expert Advisor continuously poll each other's problem tracking databases for record changes, keeping them in sync.

"That allows us to document calls as we receive them on Expert Advisor, and if we have to refer calls to a higher level programmer, those programmers can use Netman to track the problem," Trisko said.

The insurer had already made a sizable investment in Netman and had trained about 250 IS people how to use it.

"I didn't have to retrain them, and I didn't have to give them new equipment," Trisko said. "They can still use the product they were used to using, but the help desk personnel have an easy tool to work with."

Trisko said his company is working with a consultant on building up Expert Advisor's knowledge base. Once that has been accomplished, he said he expects the help desk to be able to handle 75% of all problems on the first call.

"With the knowledge base up to speed, 75% is a goal I think we can accomplish," he said. **Z**

Software and Hardware Product Demos Available Now on *Network World's NetACCESS*

# Take a Break and Try Something Off Our New Menu



Get a taste for some of the latest networking products with *Network World's NetACCESS*.

Available on *Network World's* Electronic Bulletin Board System (BBS), callers to NetACCESS can download demonstration copies of products offered by *Network World* advertisers for a trial run. And since the demonstration is interactive, callers can find out, quickly and easily, as much or as little as they need to know in a new and exciting manner.

To sample the variety of demos NetACCESS offers, use your IBM, Apple or other micro-computer to reach the BBS at 300 to 2,400 bit/sec (8N1) by dialing 508-620-1160. Call 508-620-1178, for speeds up to 9.6K bit/sec.

All *Network World* advertisers are offered the opportunity to place demonstration copies of their products on NetACCESS for one month after their ad appears in *Network World*. Both high and low density, 3 1/2" and 5 1/4" diskettes as well as DOS®, Windows® and/or Macintosh® applications and presentations are acceptable. 500K is recommended for brief download time. Advertisers may also choose to have a BBS logo placed on their ad advising readers that a demonstration of their product is available on the BBS.

Sound interesting? For more information, call Debra Mahler at 508-820-7477 today.

## Special Features This Month On NetACCESS

**Communications Devices, Inc.**  
**Network Windows Demo**  
Requires a MS-DOS PC with 640K and a color monitor.

**Compaq**  
**Product Line Demo**

**Cooper and Associates**  
**Teletutor Demo**  
Demonstration of the latest Teletutor course on Frame Relay applications and technology. Fixed disk and VGA required.

**Futurus**  
**Futurus Team Demo**  
Electronic Mail, Schedulers, Phone Message Center and more. Requires VGA.

**Lotus**  
1. **cc:Mail for DOS Demo**  
Requires MS-DOS.  
2. **cc:Mail for Windows Demo**  
Requires Windows.

**Microcom**  
1. **Carbon Copy for Windows Demo**  
Requires Windows.

2. **Microcom LANlord®** **New!**  
LANlord is an integrated system for realtime, centralized management of PCs and LANs. Demo shows how product can be used for network troubleshooting and includes fax for obtaining evaluation unit.

**Network Communications Corporation**  
**PC40 Network Probe Demo**  
Requires EGA/VGA.

**Network Dimensions, Inc.** **New!**  
**Grafnet Plus**  
Provides visual presentation of networks on geographical maps of the world, plus extensive reports for the documentation of network parameters.

**Network General**  
**Product Line Demo**  
Including the Expert Sniffer LAN Protocol Analyzer and Network General's distributed Sniffer system.

## The net manager as a public figure

*continued from page 31*

sive passive voice that announced certain things would be done but never explained why. In this example, the department is no longer some distant third-person entity.

The author also uses terms such as "we" and "you" to personalize the news and to invite the readers' understanding and cooperation. And this message stays away from jargon, simply conveying its advice to users.

As a provider of vital communications utilities, network managers must be conscious of the public image they display every time they dispatch a message to the user community. All such correspondence should reflect a dedication to customer service, openness, accessibility and a sincere willingness to help. Don't negate your goals by allowing your department to appear cold, bureaucratic and unapproachable. **Z**

*Schmall is director of telecommunications for an insurance holding company.*



**TO CUT EXPENSES, YOU NEED NEW TECHNOLOGY.**

**TO GET NEW TECHNOLOGY, YOU NEED MORE MONEY.**

**TO REACH FIFTY, YOU NEED TO RELAX.**

**THE PAIN** is written all over your face. They just asked you to centralize the data network. Congratulations. You feel like you do enough already to have your name on the door. Now you'll get even less sleep. See even less of your friends and family. And eat breakfast and dinner at your desk for at least two months. Great perks, huh?

**TO KEEP YOUR JOB, YOU NEED TO GET IT DONE.**

**THE TRUTH** is, they don't care what it takes. As long as it gets taken care of. That's why you need the most dependable telecommunications partner you can find. South Central Bell. No matter what data transmission challenges face your business, South Central Bell's highly reliable network and services can help you meet them.

If your business needs to connect several locations, there's MegaLink® service. It lets you create your own private-line digital transport network for voice, data and image transmission at 1.544 Mbps. It can be leased on a point-to-point basis or as a stand-alone local channel so it gives you configuration flexibility. You can even use it to configure your network with other link-connectable South Central Bell services.

For moving data on a smaller scale, there's SynchroNet® service. It's the private-line communications service that transmits at more than 99.6% accuracy so it's incredibly reliable. Since it provides digital data transmissions at speeds of anywhere from 2.4 to 64 Kbps, it also gives you a high degree of flexibility.

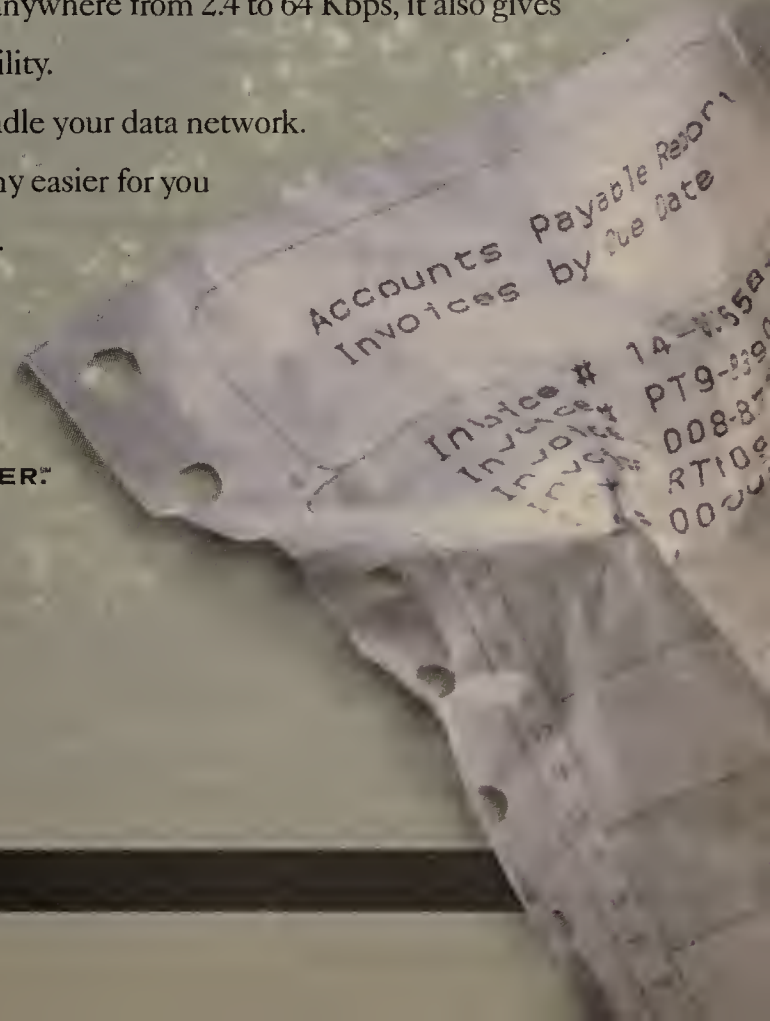
These are just a few examples of the many ways we can help make it easier for you to handle your data network.

Call South Central Bell at 1 800 522-BELL for more information. We're not saying we'll make it any easier for you to reach your next birthday. We can, however, make it a lot easier for you to reach your potential.

**WE HAVE THE VISION TO PUT IT ALL TOGETHER.™**



**South Central Bell®**





## VIDEOCONFERENCING

BY JACK SHORTER and DALE JOHNSON

# There's more to video than meets the codec

There is an important tool available for network managers who oversee videoconferencing systems, and for once it is not a piece of fancy new equipment. Instead, it is a teaching concept that will help users establish effective videoconferences in which participants become more involved in the discussion and learn the most they can.

Called orchestrating, this concept calls for a videoconference originator to set clear goals for the videoconference and define a set of activities that get participants to think about the topic or do tasks that demonstrate how well they are comprehending the material being presented.

Orchestrating will help today's net manager sidestep the land

mines that buried dreams of corporate video in the early 1980s, which saw the introduction of equipment and circuits supporting full-motion video, worldwide delivery and eye-opening cost advantages. Firms got excited by video's promise to cut travel expenses and make people more productive.

But the enthusiasm subsided when end users admitted they preferred face-to-face interaction. Some users indicated they

Watching and listening does not automatically result in thinking.



didn't feel involved in a videoconference and felt as if they were just watching TV, a perception that must change if videoconferencing is to deliver on its promise.

To alter this perception, net managers need to design a training program that goes beyond explaining how to operate videoconference equipment and gets across three key points:

- Users should carefully establish the learning or comprehension goals of the videoconference. Exactly what data, knowledge or content needs to be conveyed?
- Users should list the thinking and doing activities that will help participants attain the meeting's goals.
- Users should list the audio, video and data needed to guide participants through the thinking and doing activities.

For example, the goal of a videoconference could be to get branch office accountants to understand additional data storage and retrieval techniques required under a new law. In orchestrating the videoconference, a head office accountant could describe current procedures, read selected portions of the new procedures and ask branch office accountants to demonstrate their understanding by accessing a specific data file.

The key is to encourage the videoconference originator to feel in control of the communications process.

There are some misconceptions about learning and comprehension that need to be recognized. Simply providing a forum for interaction, such as two-way video, does not guarantee high levels of comprehension. Similarly, watching and listening does not automatically result in thinking.

What does work is when someone can act like an orchestra leader, guiding people through a series of carefully planned thinking and doing activities that get them involved in the videoconference instead of just watching TV. ■

*Jack Shorter and Dale Johnson are associate professors in the management information systems department at the University of Wisconsin-Eau Claire.*

## NETWORK WORLD

**Editor**  
John Gallant

**Executive Editor**  
John Dix

**Assistant Managing Editor — News**  
Paul Desmond

**Senior Editors/News Coordinators**  
Bob Brown — Industry Update  
Wayne Eckerson — Enterprise Applications  
Bob Wallace — Global Services  
Caryn Gillooly — Local Networking  
5423 Gladewright Drive  
Centreville, Va. 22020  
Phone: (703) 266-1537  
Fax: (703) 266-1543

**Senior Editors**  
Jim Duffy — Data Net Architectures  
Michael Cooney — Data Net Architectures  
14701 Bentley Square  
Centreville, VA 22020  
Phone: (703) 830-8138  
Fax: (703) 830-7963

**Senior Writers**  
Joanne Cummings — Management Strategies  
Reader Advocacy Force Coordinator  
67 Highgate Road  
Marlborough, MA 01752  
Phone: (508) 481-6061  
Fax: (508) 485-5809  
Maureen Molloy — Internetworks

**Staff Writer**  
Skip MacAskill — Internetworks

**West Coast Bureau**  
Timothy O'Brien  
Bureau Chief/Enterprise Applications  
2088 Union Street, Suite 2  
San Francisco, Calif. 94123  
Phone: (415) 771-3530  
Fax: (415) 771-2817

**Washington D.C. Bureau**  
Anita Taff  
Bureau Chief/Global Services  
Phone: (202) 879-6744

Ellen Messmer — Senior Correspondent  
National Place  
1331 Pennsylvania Ave. NW, Suite 505  
Washington, D.C. 20004  
Phone: (202) 879-6752

**Features Editor**  
Charles Bruno

**Managing Editor — Features**  
Jim Brown

**Associate Features Editors**  
Susan Collins  
Alison Conliffe  
Kyle Nitzsche

**Design Editors**  
Susan Champeny  
Susan Slater

**Assistant Managing Editor — Production**  
Beth Khoury

**Associate Editor**  
Michelle Beaulieu

**Copy Editors**  
Karen Moltenbrey  
Monica Sambataro

**Assistant to the Editor**  
Cheryl Tynan

**Editorial Assistant**  
Glenna Fasold

**Contributing Editors**  
Daniel Briere  
James Kobielus  
Alan Pearce

**Teletoons**  
Phil Frank  
Joe Troise

**President/Publisher**  
Colin B. Ungaro

**Director of Financial Operations**  
Mary Fanning

**Network World**  
161 Worcester Road  
Framingham, Mass. 01701  
(508) 875-6400  
MCI Mail — 390-4868  
Fax: (508) 820-3467  
R.A.F. hot line:  
(800) 622-1108, Ext. 487

## USER ADVISORY PANEL

**Laurie Bride**  
Manager, Communications Technology,  
Boeing Computer Services

**Roy Bruce**  
Manager of Voice Communications, The Coca Cola Co.

**Byron Comp**  
President, Association of Banyan Users International  
Senior Technology Specialist, Marshalls, Inc.

**Phillip Evans**  
Director, Telecommunications, Perot Systems Corp.

**Len Evenchik**  
Director of Communications,  
The Commonwealth of Massachusetts

**Thomas Festa**  
Communications Director, Liberty Brokerage, Inc.

**Lionel Gillerman**  
Telecommunications Services, McDonnell Douglas  
Aerospace Information Services Co.  
Vice-President for Regulatory Affairs,  
Tele-Communications Association, Inc.

**Robert Hamilton**  
Information Technology Engineer, Hewlett-Packard Co.  
President, Tele-Communications Association, Inc.

**E.W. Bud Huber**  
Senior Consultant, Hughes Aircraft Co.  
Chairman, User Alliance for Open Systems

**Michael Kaminski**  
Manager, CIM/Networking Technologies  
General Motors Corp.

**Michael Kilbane**  
Senior Advisor, International Communications Association  
General Manager of Systems Development,  
Diamond Shamrock

**Ron Kopitowsky**  
Telecommunications Director, Metropolitan  
Transportation Authority of New York State  
First Past President  
Communications Managers Association

**Charles Murray**  
President, Communications Managers Association  
Telecommunications Director, The Travelers Insurance Co.

**Chuck Papageorgiou**  
Manager, United Parcel Service, Inc.

**Henry Pfendt**  
Director, Information Technology Services,  
Eastman Kodak Co.

**Kenneth Phillips**  
Vice-President, Office of Telecommunications Policy,  
Citicorp  
Chairman, Committee of Corporate  
Telecommunications Users

**William Pomeroy**  
Director of Telecommunications Public Policy,  
International Communications Association

**Richard Sidoli**  
Telecommunications Director, Morgan Stanley

**Laura Swanton**  
President, NetWare Users International  
Hughes LAN Systems, Inc.

**Jane Videtich**  
President, International Communications Association  
Systems Development Manager, R.J. Reynolds Tobacco Co.

**Stanley Welland**  
Manager, Corporate Telecommunications  
General Electric Co.

**Ronald West**  
President, Association of Data Communications Users  
Manager of Telecommunications and Office Automation,  
Shearman & Sterling

## EDITORIAL

# Vendors need to back up interoperability claims

Although vendors preach commitment to standards and interoperability, it's clear from user comments at the INTEROP 92 Fall conference that actions really do speak louder than words.

Take, for example, the two Fiber Distributed Data Interface-over-copper demonstrations that took place during INTEROP. Instead of teaming and taking advantage of the show's high visibility, the Cabletron Systems, Inc.-Crescendo Communications, Inc. duo and the SynOptics Communications, Inc.-Network Peripherals, Inc. team ran separate demos.

The companies demonstrated the viability of products based on the proposed ANSI FDDI-over-copper standard, dubbed

CDDI, which is expected to be finalized within six months.

But they missed an important opportunity to prove that multi-vendor products based on CDDI could actually interoperate in real-world situations.

Given that vendor infighting unnecessarily delayed the CDDI standard — and gave Asynchronous Transfer Mode more time to become established in users' minds as a high-speed net alternative — one has to wonder why these four companies didn't work harder to come together on these demos before INTEROP.

While a major trade show is not the venue to do actual interoperability testing, some coordinated effort on demonstrating the technology was certainly do-

able. As a matter of fact, the companies did try to get together during the weeks before INTEROP, but unresolved issues ultimately kept them apart.

Simply put, that's not good enough.

The lack of coordination only served to cloud the CDDI issue for users, who said a combined demonstration would have given them more confidence in the technology.

Users want nonproprietary, standards-based products that can interoperate regardless of the vendors involved.

It's time for vendors to prove there is substance behind their claims by actually working together on interoperability and standards issues. It's time to put users' needs first. ■



# OPINIONS

## REPORTER'S NOTEBOOK

BY TROY HUBRIS

### A twisted view of SONET

I was grubbing around for free T-shirts and sunglasses on the exhibit floor of INTEROP South America 92 in Lima, Peru, and wondering just how many of the grinning vendor reps were members of the Shining Path movement, when I remembered the press conference.

Thinking there might be free food, I raced over to the press room, where some guy in a Brooks Brothers pinstripe was intoning monotonously at a podium. I sidled up to one of my brethren in the great cause of trade journalism and asked what was up.

"Get lost, Hubris," he grumbled through a mouthful of shrimp.

OK, time for some investigative work. I grabbed a press kit with one hand, some sushi with the other and sat down.

The news hit me like a reject-

ed expense report. A consortium of the biggest networking vendors had proposed a plan for Synchronous Optical Network (SONET) over unshielded twisted pair.

"Why are we wasting time developing frame relay, SMDS and ATM?" asked the speaker, a marketing vice-president for Vast Networks, Inc. "SONET is the future, and we end up doing everything over twisted pair anyway. So let's skip all this nonsense in between and give users what they really want."

#### Limitless possibilities

Imagine, 13.22G bit/sec to the desktop! Sure, there were problems with the plan. First off, devices had to be less than a foot apart. Then there was that fire-hazard thing. Seems the wire would burst into flames sometimes.

But that was short-term thinking. Imaging, multimedia — no problem! Hell, the entire Library of Congress could be downloaded to your hard drive before you had a chance to swallow the first bite of a jelly doughnut.

The possibilities were limitless, particularly for me. I'd milked the Ethernet, token-ring and Fiber Distributed Data Interface over twisted-pair stories on Page 1 for years. This news was guaranteed lead-slot material!

And the next SONET-over-UTP consortium's meeting is scheduled for INTEROP Monte Carlo next month.

Perfect! Count me in. **■**

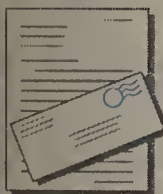
*Hubris is a free-lance network journalist who writes about the industry when he feels like it.*

## TELETOONS

BY FRANK AND TROISE



## LETTERS TO THE EDITOR



#### Loopback tests

Darrell Anderson's Alligators in the Swamp article ("Carrier circuit problem throws user net for a loop," NW, Sept. 28) attempts to blame carriers for 95% of circuit problems without justification. While his advice that carrier lease agreements should include credit for downtime is understandable and proper, we wonder if any carrier reimbursement could be justified in Mr. Anderson's case, given his apparently haphazard troubleshooting technique.

Mr. Anderson's conclusion that a circuit problem caused his downtime is not consistent with the admitted fact that, initially, something was corrupting his Synchronous Data Link Control frame.

It is inconceivable that leaving the circuit in loopback mode could have caused this framing problem. It is entirely conceivable that replacement of the high-speed synchronous card in the multiplexer at his end restored the signal.

Loopback tests should be performed in logical sequence, starting with a series of in-house

tests on the part of the circuit closest to the terminal affected and gradually progressing to the distant end. Each phase in this progression enables the troubleshooter to test circuit segments logically.

With the random approach used by Mr. Anderson, the troubleshooter could come to false or premature conclusions before the problem is isolated.

We also suggest Mr. Anderson could save money by paying for carrier maintenance on an as-needed basis. Perhaps he could call it the 5% solution.

(The opinions expressed above are the authors' own.)

Hank Campbell-Ickles  
Craig Allen  
Telecommunications  
specialists  
Department of Justice  
Washington, D.C.

#### A few words on my words

A quote of mine appearing in a recent article ("Tariff-tracking companies help keep tabs on services," NW, Oct. 12) needs clarification. In this quote, I noted that we at The Aries Group/MPSG expect our tariff vendors to inform us of missing information.

The Aries Group/MPSG has a long-established tariff monitoring and cross-checking process that alerts us to any missing tariff information. Our tariff library and databases must be, and are, meticulously kept; our business depends on it.

Over the years, we and our vendors have worked diligently to ensure the accuracy and timeliness of our tariff data. Our vendors have responded favorably to our persistence, and we have all become better at what we do. While our level of comfort with these vendors has improved over time, we still take the monitoring process very seriously.

It was also mentioned in the article that one of our vendors, TIS of Concordville, Pa., has a copy-quality problem. We have been a TIS customer for years. On the rare occasions when poor copies were released, TIS automatically replaced them at no cost to us.

When dealing with even the best tariff vendors, remember the old adage, "You get what you inspect, not what you expect!"

Ann Bookbinder Custodio  
Product manager  
The Aries Group/MPSG  
Rockville, Md.

#### Good test but . . .

I read with great interest the results of your frame relay switch test ("Designs make or break frame relay switches," NW, Sept. 14). However, some areas were either ambiguous or possibly incorrect.

The benefits of a cell-based switch will not be realized in an intranodal test scenario. Frame relay data terminal equipment (DTE) output and receive entire frames. Therefore, any cell-forwarding capability a switch provides will occur only on an internodal trunk. Perhaps this is why the cell-based switch in your comparison fared better in the internodal scenario, and not because of the higher speed trunk connecting the two switches, as suggested.

Also, the article implies the test team was surprised that the switches did not throttle back when congestion occurred. I am interested in knowing if the analyzers used as frame relay DTE were implementing flow control. The frame relay DTE has the responsibility to throttle back the output of frames, yet your article implied that the analyzers were simply monitoring explicit congestion notification

bits and not reacting to them. If this were the case, frame discards should have been considered to be a normal occurrence.

There was no mention of Backward Explicit Congestion Notification (BECN) monitoring, which I found strange. It is BECN that would enable frame relay DTE to implement flow control.

By observing Forward Explicit Congestion Notification (FECN) bits, the only type of data that would be throttled back would be acknowledgments in the reverse direction, not the actual data being transmitted.

John Agosta  
Professional  
Communications Services  
Schaumburg, Ill.

*Author's note: What Mr. Agosta says about the benefits of cell switching is true if the cell switch were designed in a store-and-forward manner in which the DTE must finish transmitting a frame before the many smaller cells into which the frame had been broken.*

(continued on page 62)

Letters may be edited for space and clarity.



# Listen to the Network Brass.

## **NetWorld 93.**

### **Charting the Future of Networking.**

On January 12-14, the biggest connectivity jam session this side of the Atlantic swings into Boston. NetWorld 93 tops the charts as the computer industry's #1 networked computing trade show and conference. Regarded as the industry's blockbuster networking and internetworking event of the year, NetWorld showcases the latest software releases and hardware breakthroughs — all designed to help you determine the future of networking. It's the one show where your business initiatives and the industry's technological advances meet for long-term success.

### **Tune in to NetWorld's Product-Packed Show Floor.**

Whether your instrument of choice is LANs, MANs, WANs, or global enterprise networks, NetWorld brings it all together with hundreds of exhibitors, thousands of attendees and many of the industry's most influential personalities. You'll be tuned-in to mission-critical application programs, products and services. What's more, you'll be turned-on to NetWorld's state-of-the-art ShowNet. The innovative ShowNet network places critical information services, such as electronic mail, right at your fingertips. And with ShowNet's NOTES® capability, you can compose and communicate much needed information over diverse computer networks. Without ever leaving the exhibition hall.

### **A Symphony of Educational Seminars.**

NetWorld 93's curriculum of educational seminars and workshops are designed to address the industry's most important issues. Take part in informative classes where networking strategies and global connectivity issues are played on an OSI scale of one to seven. And discover why bandwidth, groupware and wireless networks are the industry's latest buzzwords.

### **Orchestrate Your Plans Today.**

So, if it's hardware oldies, today's networking rap or a new generation of communications products you're looking for — NetWorld's top networking brass are on hand to help you discover and master it all.

For additional show information, or to reserve your exhibition space, contact Show Manager Jodi Levine at 800-829-3976 or 201-346-1400 (x143); FAX 201-346-1602. For hotel and travel arrangements, contact All Conference Travel at 800-829-2281 or 201-346-0300.

## **NETWORLD 93 BOSTON**

### **The Universal Communications Network**

#### **January 12-14, 1993 • Hynes Convention Center**

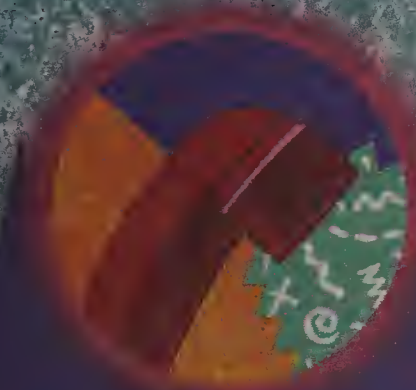
 Blenheim Group PLC

NetWorld® Boston is produced and managed by Bruno Blenheim Inc.  
Fort Lee Executive Park • One Executive Drive • Fort Lee, NJ 07024  
800-829-3976 • 201-346-1400 • FAX 201-346-1602

NetWorld Expositions in the USA and Europe are owned, produced and managed by Bruno Blenheim Inc.  
NetWorld is a registered servicemark of Novell, Inc. licensed exclusively in the USA and Europe to Bruno Blenheim Inc.  
NOTES is a registered trademark of Lotus Corporation. ShowNet is a registered servicemark of Bruno Blenheim Inc.



## BUYERS



## GUIDE

SWITCHED  
DIGITAL  
SERVICES

# Sizing up switched digital services

Switched digital services are coming of age.

Once the poor cousin of leased lines, switched digital services are shedding their image as a backup service and shouldering new applications and increased traffic generated by greater user acceptance.

Long-haul carriers, meanwhile, are packaging switched data services with virtual network and other outbound voice services to aggregate switched data traffic onto existing discount plans. Additionally, carriers continue to keep switched data prices low — either at or near voice prices — for 56K and 64K bit/sec services. All of this activity is enticing users to turn to switched data services.

Local carriers are moving to fill in spot-service availability and are lowering prices on existing services — although they still charge more for switched digital offerings than the interexchange carriers. Local carriers are also continuing the slow drive toward implementing Integrated Services Digital Networks.

A broadening array of increasingly functional and less expensive switched data customer premises equipment has enabled customers to pull together multiple switched circuits on a flexible, on-demand basis to support such growing applications as videoconferencing and LAN-to-LAN connection. (See related story on page 44 for a discussion of the changing CPE picture.) Dubbed "Nx," or "N by," this use of inverse multiplexing aggregates 56/64K bit/sec or 384K bit/sec lines to support application needs at speeds above 64K bit/sec without users having to purchase higher speed switched or dedicated data services. Nx capabilities also support applications that have flexible bandwidth needs by adding and dropping channels as bandwidth needs fluctuate. And the switched nature of the service enables users to connect with a wide variety of end points — something not possible with leased lines.

Bandwidth is the primary factor in splitting the switched digital market. Bandwidth offerings range from speeds of switched T-1 (1.544M bit/sec) and T-3

**Interexchange carriers compete on price and high-bandwidth options, while local exchange carriers expand service availability.**

(45M bit/sec) to switched 384K bit/sec and switched 56/64K bit/sec. In addition, the Nx capabilities span the market with their ability to deliver variable switched rates.

Switched digital T-3 and T-1 services top the high end of the market by allowing users to handle large yet intermittent file transfers, full-speed backup of dedicated links and other high-bandwidth applications. These are now available either as a single contiguous connection or as an aggregate of 56/64K bit/sec or 384K bit/sec connections. These high-end offerings remain a niche service, with low-speed 56/64K bit/sec services still dominating the market.

Only AT&T offers a contiguous 384K bit/sec service, although all three interexchange carriers offer 384K bit/sec on an Nx basis.

A range of switched digital 56/64K bit/sec services are available from the local exchange carriers and long-haul carriers. Both ISDN and non-ISDN interfaces are available. Continuing low prices from the interexchange carriers and falling prices from the local carriers have made this the bread and butter of most switched digital needs.

However, users would be wise to scrutinize the high-end offerings because they

*(continued on page 40)*

By DANIEL BRIERE and MARK LANGNER



## Switched digital services: 56K/64K interexchange carriers

Company	Telephone	Service	Net	Access method							Maximum post-dial delay (seconds)					Maximum errored seconds per day			Maximum call blocking (percent)	Foreign links  C = Canada J = Japan U = UK	Other services required	Fees		
				Separate data net	Public net	56K bit/sec					64K bit/sec	LSDS	DDS	T-1	BRI	PRI	POP to POP	Severely errored				Percent error-free	Per minute (cents)	Volume discount
						LSDS	DDS	T-1	BRI	PRI														
AT&T	(800) 222-7956	Accunet Switched Digital Services	✓		✓	✓	✓	✓	✓	✓	8	6	6	5	5	49	6	99.84	1	C,J,U (1)	NA	11 - 22		
		Software-Defined Data Network	✓		✓	✓	✓	✓	✓	✓	8	6	6	5	5	49	6	99.84	1	C,J,U (1)	SDN	7 - 15	37%	
MCI Communications Corp.	(800) 933-9029	VPDS Switched 56/64	✓		✓	✓	✓	✓	✓	✓	10	7	7	5	5	36	6	99.99	1	C,J,U	NA	7 - 21		
		Vnet VPDS Switched 56/64	✓		✓	✓	✓	✓	✓	✓	10	7	7	5	5	36	6	99.99	1	C,J,U	Vnet	7 - 21	35%	
		Vision VPDS Switched 56/64	✓		✓	✓	✓	✓	✓	✓	10	7	7	5	5	36	6	99.99	1	C,J,U	Vision	11 - 23	36%	
Sprint Corp.	(800) 736-1130	Dial 1 Digital		✓	✓		✓	✓			8		7	7		140	22	99.85	1	U (2)	NA	18 - 25		
		VPN 56/64		✓	✓		✓		✓	✓	8		7		7	140	22	99.85	1	U (2)	VPN	6 - 23	33%	

BRI = Basic Rate Interface  
 DDS = Digital data service (dedicated 56K bit/sec line)  
 LSDS = Local Switched Data Services  
 NA = Not applicable  
 POP = Point of presence

PRI = Primary Rate Interface  
 SDN = Software-Defined Network  
 Vnet = Virtual Network  
 VPDS = Virtual Private Data Service  
 VPN = Virtual Private Network

FOOTNOTES:  
 (1) AT&T also provides switched 64K bit/sec service to 16 other countries.  
 (2) Sprint also provides switched 64K bit/sec service to Hong Kong, the Netherlands and Singapore. Customers must be Global VPN customers to use 64K bit/sec switched services.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

(continued from page 39)  
 represent future migration paths for switched data use. Some users are replacing N by 56/64K bit/sec services with N by 384K bit/sec as requirements increase. In these high-end services, factors such as contiguous bandwidth vs. aggregated lines come into play. Access to local services is also a critical factor for both high- and low-end offerings.

The low end of the market, by contrast, is marked by aggressive price cutting and service availability.

This Buyer's Guide will focus only on circuit switched data services. Packet switched options, such as frame relay and SMDS, will be covered in a future Buyer's Guide.

**Contiguous vs. Nx**

One of the main choices users have to make today for switched T-1 and switched 384 class services at the upper end of the market is whether to purchase contiguous switched data services or to use inverse multiplexing.

The Consultative Committee

on International Telephony and Telegraphy has defined two standards for high-speed data service, H0 and H11, which address contiguous 384K and 1.536M bit/sec speeds, respectively. Most of these services are available either as switched stand-alone services or in conjunction with other outbound services, such as virtual network or "custom" services covered under AT&T's Tariff 12 contracts. When switched data services are included in these packages, the usage often contributes to volume discount plans and, therefore, costs less.

Customers can also use inverse multiplexing to aggregate any of these services on an Nx basis, where "N" equals the number of underlying data channels that a customer aggregates. For example, Nx64K bit/sec means a customer can obtain multiples of 64K bit/sec circuits on demand. All three interexchange carriers support Nx capabilities.

A key benefit of inverse multiplexing is that it allows customers to obtain speeds that are multiples of tariffed service speeds.

For instance, if a customer needs 384K bit/sec bandwidth, that customer could purchase a single 384K channel from AT&T, the only carrier that offers this speed as a single contiguous link. The customer could also use an aggregate of six 64K bit/sec channels (6 x 64K = 384K) or seven 56K bit/sec channels (7 x 56K = 392K).

For Sprint customers, aggregating channels on an Nx basis is the only way to access speeds above 64K bit/sec.

When deciding whether to use contiguous circuits or aggregated Nx circuits, users should be aware that they are set up differently — especially at high bandwidths. Nx connections use multiple, non-contiguous — and sometimes diversely routed — channels to form a certain bandwidth; contiguous switched data services provide that bandwidth over a single link.

Reliability is the issue. Aggregated bandwidth gathered in an Nx service is more likely to suffer an outage than a single contiguous channel, such as those of-

ferred by AT&T. The reason is simple: There are six times as many circuits in the contiguous link. Customers must decide where their priorities lie.

But many applications are designed for use in Nx links. When they detect the loss of some bandwidth, they are capable of easing back the data transmission rate. Where the H0-based solution would lose the entire application if the circuit fails, the Nx56/64K bit/sec solution would merely slow when redialing the lost circuit.

**Close competition**

Buying criteria for switched digital services from the interexchange carriers boils down to very few issues. The central choice for higher bandwidth offerings is whether to purchase Nx or contiguous services. The three carriers support Nx user aggregation, but their contiguous services differ.

Today, AT&T has the only switched 384K service and MCI Communications Corp. has the only switched contiguous T-3 ser-

vice. AT&T and MCI offer switched contiguous T-1. Since the public network has evolved into a largely digital infrastructure and is reliable, issues such as guaranteed uptime and performance have taken a backseat to price and availability in the purchasing decision.

"I don't think quality is that much of an issue when you are comparing switched 56K, 64K or H0 services," says Ed Hodgson, manager of computing and communications services at Schindler Elevator Corp. in Morristown, N.J. "All of it is fairly equivalent and good; it's all digital."

At the low end, prices remain at or near those for switched voice services. Interexchange carriers' switched data rates range from 6.2 cents to 22 cents per minute for switched 56/64K bit/sec services without volume discounts, and these can drop by as much as 37% with discounting. In general, Sprint Corp. is the low-cost provider here.

Apart from features specific to certain services or data rates, one point that separates Sprint from

## Switched digital services: 384K bit/sec

Company	Telephone	Service	Separate data net	PRI access	Maximum post-dial delay (seconds)	Other service required	Errored seconds per day			Maximum call blocking	Fees	
							POP to POP	Severely errored	Error-free		Per minute	Max. volume discount
AT&T	(800) 222-7956	Accunet Switched Digital Services	✓	✓	4		49	1-6	99.84 %	1%	\$0.61 - \$1.29	
		Software-Defined Data Network	✓	✓	4	SDN	49	1-6	99.84 %	1%	\$0.30 - \$0.68	37%

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.



## “I WANT TO BOOST MY NETWORK PERFORMANCE.”

- ☐ Please send me information on Racal-Datacom's DSU product line.  
☐ Please have a sales person call me.

Name \_\_\_\_\_

Title \_\_\_\_\_

Organization \_\_\_\_\_

My Company Is: ☐ End User ☐ Reseller ☐ OEM/SI

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone ( \_\_\_\_\_ ) \_\_\_\_\_

OR CALL 1-800-RACAL-55

**Racal-Datacom™**

WE UNDERSTAND NETWORKING INSIDE AND OUT.™ **RACAL**

© 1992 Racal-Datacom, Inc. All rights reserved.

3353





No Postage  
Necessary If  
Mailed In The  
United States

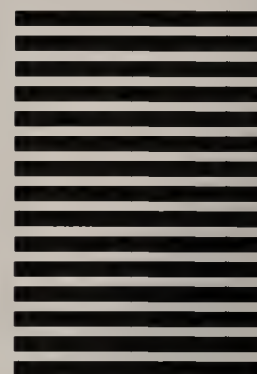
# BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 140 BOXBOROUGH, MA

Postage Will Be Paid By Addressee

## Racal-Datcom

ATTN: Pre-Sales Support  
155 Swanson Road  
Boxborough, MA 01719-9980





T&T and MCI is that Sprint runs data over the same network as its voice services, while MCI and AT&T run separate subnetworks dedicated to data services. These two carriers argue that separate digital data networks ensure digital connectivity and are designed to meet the needs of data transport, not voice.

Sprint says its single digital fiber-based network handles voice and data equally well and sees no need for a separate network for data.

Aside from this issue, which may not in the end add up to a difference in service great enough to sway buyers, one practical concern is that users of Sprint's network must have customer premises equipment that be capable of issuing the proper tone to disable echo cancelers Sprint uses for voice in order to send data. This is a standard feature of most customer premises equipment, but if the echo cancelers are not disabled, the user will have problems maintaining throughput.

Another difference between the interexchange carriers is that Sprint does not offer switched data services above 64K bit/sec on a contiguous basis because of a limitation in its network switches, though the company says it plans to do so. Of course, customers can aggregate to high bandwidths using inverse multiplexing.

#### The high end

MCI is the only carrier currently offering switched T-3. The carrier has a non-ISDN based switched T-3 service that fills a niche in MCI's switched data portfolio, providing T-3 back-up capabilities and supporting massive intermittent file transfers.

Both AT&T and MCI have switched T-1 services, which differ mainly in the signaling method used.

AT&T offers a 1.536M bit/sec service based on the CCITT H11 standard requiring ISDN access. This service is not available as part of Software-Defined Data Network (SDDN). AT&T requires a customer to have both an ISDN Primary Rate Interface (PRI) and a separate T-1 for its switched T-1 service.

The H11 service requires out-of-band signaling and 24 contiguous 64K bit/sec channels. A PRI has only 23 contiguous 64K bit/sec channels with the 24th channel used for out-of-band signaling. AT&T uses the out-of-band signaling on the PRI to control the 24 channels of the T-1. This leaves the 23 PRI channels unused. They can be used for voice or data, although an additional signaling channel must sometimes be added.

MCI provides three signaling choices for its switched T-1 services — none of which use ISDN. A customer can use in-band signaling, provided on the data transport carrying T-1; out-of-band signaling, provided over a dedicated line; or out-of-band signaling, provided over a dial-up line. Using out-of-band signaling adds to the cost of the service, although MCI is waiving fees for dial-up out-of-band signaling through the end of the year. However, when using inband signaling for switched T-1 service, you do not get a full T-1 of bandwidth.

There is little other than price and availability to differentiate the three interexchange carriers at the 56/64K bit/sec level.

All three interexchange carriers pro-

vide a 56K bit/sec service, a standard in the U.S. and Japan. Switched 56K bit/sec services make a good migration service for customers dropping more expensive dedicated digital data services (DDS).

All three interexchange carriers also support 64K bit/sec services. The 64K and 56K bit/sec services are usually marketed as the same service. The main difference between 56K bit/sec service and 64K bit/sec service is that 64K requires ISDN, except for MCI's use of a switched 64K bit/sec service with a second dedicated or dial-up line for out-of-band signaling.

Around the world, 64K bit/sec is a standard for switched data and is a requirement when connecting to overseas switched data services. All three carriers offer these 56/64K bit/sec services as separate stand-alone services or integrated into virtual network pricing and discount plans.

The only other major differentiation between the carriers is international connectivity.

Switched data options for users continue to expand overseas. AT&T continues to have a commanding lead over MCI and

Sprint in the sheer number of countries to which its switched 64K bit/sec connects.

Accunet Switched Digital Services International service provides switched 64K bit/sec service to 19 countries. Sprint's Global Virtual Private Network product provides switched data services to three areas — the U.K., Hong Kong and the Netherlands — with announced plans for three other countries. MCI, which until recently has been absent from the international switched data market, has rolled out switched data services to three countries

(continued on page 44)

1-800 RACAL 55

6400 SERIES

EXCALIBUR FAMILY

NETWORK MANAGEMENT

COMPREHENSIVE SOLUTIONS

NETWORK INTEGRATION

1-800 RACAL 55



**To Have Total Network Control,**

**With Unsurpassed Capabilities,**

**You Need A Line Of DSUs**

**From A Company That Boosts Performance To New Heights.**

**Racal-Datacom.**

Our DSUs boost your network performance across the line. With more than 20 different models for all your network requirements. With more features, more flexibility, and more control — at much lower network costs.

Take our multiport/multidrop DSUs. Because they send multiple applications over the same multidrop circuit, they'll send your circuit costs into a nosedive. And our rate adaptation feature lets you change speeds without expensive equipment changes or network re-engineering charges.

Using our unique "access multiplexing" capability, you can consolidate all your DSU traffic onto T1 circuits for lower costs at the local loop. And for backup protection, our automated dial restoral lets you pool equipment, eliminating hardware and reducing overhead.

We provide you with end-to-end network control either from our Communications Management Series (CMS®) network management system or the control panel at your DSU central site.

And we support you — on site or by phone, 24 hours a day, 365 days a year. Just what you'd expect from an international company with operations in more than 80 countries.

Call us at 1-800-RACAL-55 for information on our DSU line, from our new 6400 Series to our topflight Excalibur family. And find out how you can raise network performance to new heights.



1-800 RACAL 55

1-800 RACAL 55

**Racal-Datacom™**


**RACAL**

1-800 RACAL 55

WE UNDERSTAND NETWORKING INSIDE AND OUT.™

© 1992 Racal-Datacom, Inc. All rights reserved.



A tall skyscraper, likely the Bank of America Corporate Center in Charlotte, is silhouetted against a dramatic sky at sunset or sunrise. The sky is filled with dark, textured clouds, and a bright, low sun is visible behind the building, creating a strong backlight effect and illuminating the edges of the skyscraper's windows. The overall mood is one of modernity and forward-looking vision.


*If you were building the bank  
of the future, which premises  
wiring system would you invest in?*

## ***NationsBank chose AMP.***

NationsBank is the fourth-largest banking company in the U.S. One telling measure of that size shows up in their network, where their remarkable growth over the last decade has had people changing offices or computer equipment at a move-and-change rate significantly above average for the industry.

So when they planned their new 60-story office complex in Charlotte—the tallest building between New York City and Dallas—NationsBank knew exactly what they needed in a premises wiring system: something that could cope with a great deal of change. They found just what the banker ordered, in the AMP NETCONNECT Open Wiring System.





Sixteen floors of the new building, the key operations areas, were designated for raised floor construction and fitted with AMP Access Floor Workstation Modules and AMP Communications Outlets. The bank's custom cabling (one branch STP, two branches UTP, bonded into a single cable) is permanently terminated to the outlets, and changes are accomplished with a simple insert exchange. The inserts, available for all major equipment, provide a true "wire-once" solution, and reduce move-and-change time to minutes.

The floor modules tilt up for direct access to power (isolated ground and standard outlets for each workstation), and to the

communications outlets. The modules are located on the corners of floor tiles, which can be rotated to adjust for furniture and workstation position. The modules can also be relocated 10 feet in any direction, to accommodate changes in floor layout.

The result for NationsBank is a premises wiring system that gives them total flexibility

in moves and changes – and the speed they need to maintain both their strong customer focus...and their phenomenal growth.

For more information about the AMP NETCONNECT Open Wiring System, call 1-800-522-6752 (fax 717-968-7575). AMP Incorporated, Harrisburg, PA 17105-3608. In Canada, call 416-475-6222.

*AMP Access Floor Workstation Modules and AMP Communications Outlets give NationsBank freedom from obsolescence, allowing moves and changes in seconds.*

**THIS IS AMP TODAY.**

**AMP**



# Switched digital services: T-1/T-3

Company	Telephone	Service	Network platform			Access method					Maximum post-dial delay (seconds)			Maximum errored seconds per day			Maximum call blocking	Out-of-band Installation fees		Usage fee per minute	
						Data transport				Signaling								Dedicated	Dial-up		Dedicated
			Separate data net	T-1 subnet	T-3 subnet	T-1	T-3	PRI	Other	In-band	Out -of-band	PRI	POP to POP	Severely errored	Percent error-free						
AT&T	(800) 222-7956	Accunet Switched Digital Services	✓			✓					✓	8			49	16	99.84	1%		\$2.42 - \$5.14	
MCI Communications Corp.	(800) 933-9029	VPDS Switched T-1	✓			✓	✓	✓	✓	✓	✓		5	15			99.96	1%	\$500	\$225	\$2 - \$4.30 (1)
		VPDS Switched T-3	✓			✓	✓	✓		✓	✓		5	15			99.90	1%	\$500	\$225	\$30 - \$64.50 (2)

## FOOTNOTES:

- (1) \$500 networkwide monthly minimum per T-1 access.  
(2) \$5,000 networkwide monthly minimum per T-1 access.

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

(continued from page 41)  
this year — Canada, Japan and the U.K.

## Progress in the local loop

Local carriers have historically been the weak link in the switched data equation. Spotty coverage, expensive services and high switched access service pass-through fees have been roadblocks to widespread use of switched data services in the local service arena.

This, however, is starting to change. Local carriers are beginning to provide more options for users. Expanding ISDN availability, tariffing stand-alone ISDN services and repricing current services are all examples of how local carriers are attempting to meet the needs of switched data customers.

Local carriers are generally beginning to make ISDN services more widely available, providing ISDN as a service separate from Centrex and lowering expensive local switched 56K bit/sec services.

One area of change is in the availability of switched 56K bit/sec service. In the past, customers could only obtain a service if it was provided by their local central office switch.

But many local exchange carriers have made 56K bit/sec switched data service available on any switch in the local access and transport area (LATA). The only catch is that accessing services not provided by your local switch requires a mileage fee, a practice that keeps cost an issue in the local loop.

However, Bell operating companies' switched data services are still expensive compared to similar services offered by the interexchange carriers.

In US West, Inc.'s territory, for instance, pricing for its Switched 56 service is \$50 to \$89.30 a month, which in most places is

more expensive than the more functional ISDN Basic Rate Interface (BRI) service, which offers customers two 64K bit/sec data channels and one 16K bit/sec signaling channel.

US West says its goal is to reprice switched 56K bit/sec service to use it as a bridge between dial-up data needs and full-blown ISDN BRI. According to one US West product manager, 56K bit/sec services will survive if priced appropriately. "Not everyone needs the two data channels provided with BRI."

Other local carriers take a different approach. Bell Atlantic Corp. feels that switched 56K bit/sec services will wither away as ISDN services become more widely available.

Bell Atlantic now offers ISDN on approximately 50% of its 17 million lines, with plans to grow that figure to 87% by 1994. The firm's method for addressing market needs between dial-up services and ISDN BRI is to offer single B channels at a charge of \$16.50 a month more than current Centrex per-line charges. Customers can only get ISDN today through relatively expensive Centrex lines, although a non-Centrex-linked ISDN service is in the works for early 1993.

## Multirate ISDN in the wings

Customers may soon have another option for local loop services. Dubbed ISDN Multirate, these services will allow customers to access bandwidth from the local exchange carriers on a contiguous basis in increments up to PRI speeds — 1.536M bit/sec.

For example, a customer could use multirate at 384K bit/sec to access an AT&T 384K service. Today, customers must have dedicated access to use interexchange carrier services above 64K.

Northern Telecom, Inc. and AT&T, the two major providers of central office equipment in the

U.S., have announced this capability for local providers and are rolling out service throughout 1993. Nynex Corp. this past spring announced trials of multirate service based on Northern Telecom DMS-100 equipment.

However, these services may not be as flexible as the Nx services. If a customer dials up a 384K bit/sec connection for two applications and one finishes, the connection will not scale back to the bandwidth needs of the single application. Under multirate, the entire bandwidth stays up for the duration. Of course, customers could avoid this by dialing up in smaller increments.

## Access options

For access to interexchange carrier services and intra-LATA service, customers also have a number of choices. These include dedicated access to the interexchange carrier networks, both ISDN and non-ISDN based; local ISDN access as an add-on to Centrex service; local ISDN access as a stand-alone service; and local digital Feature Group D (FGD) non-ISDN switched access.

Dedicated access involves installing a dedicated access line directly to the interexchange carrier point of presence. These lines vary to support all speeds of switched data services.

Local ISDN as a part of Centrex service is an add-on to Centrex services in which customers can choose ISDN as a feature of their Centrex service. Local ISDN access as a stand-alone service allows customers to get ISDN access without purchasing Centrex service.

In addition, ISDN services allow customers to access switched data services at speeds up to 64K bit/sec through a BRI or PRI access interface. Access to local digital FGD — the circuit connection that provides equal access to all interexchange carriers — pro-

vides switched data access capabilities up to 56K bit/sec without ISDN.

Some of the local carriers, such as Pacific Bell and Ameritech, are beginning to offer switched PRI options. The carriers are working with the interexchange carriers so that these services can be used to access higher bandwidth interexchange carrier services, much the way that cur-

rent 56K and 64K bit/sec options are used today.

## Worth the investment?

Almost all of the higher bandwidth solutions — those above 56K bit/sec — require ISDN access. AT&T's switched 64K, 384K and 1.536M bit/sec services require ISDN access. Sprint's 64K bit/sec service also requires ISDN  
(continued on page 48)

# CPE drives new services

By Chris Finn  
Special to Network World

Evolving customer premises equipment is casting a new light on using switched digital services.

These devices facilitate access to variable bandwidths to match the needs of customer applications. An important feature of these products that help make effective use of switched digital services is inverse multiplexing, whereby an access device presents multiple channel connections as a contiguous stream of bandwidth to the application.

Initially, this equipment was designed to control the access to switched data services only; however, it has evolved into hybrid network hubs providing access to all transmission services entering a customer's premises.

Two major players challenging the multiplexer giants in the access equipment market — Ascend Communications, Inc. of Alameda, Calif., and Teleos Communications, Inc. of Eatontown, N.J. — have recently expanded their product lines.

Teleos has traditionally been a high-end equipment seller with multiapplication devices in its Network Hub line that address video, LAN-to-LAN, data

transfer and other applications. The company recently introduced the entry-level Model 40 Network Hub, which uses the same architecture and interface cards as its larger models, letting users bring smaller sites on to the net more economically.

Ascend has recently added its Multiband Plus and MultiBand Max models to extend its product lines into the multiapplication arena.

MultiBand Plus is a fully featured access device capable of running four different customer applications at the same time. MultiBand Max is a large network hub capable of managing up to 8M bit/sec network access and providing multipoint video bridging.

Lack of standards has meant that equipment from different vendors could not interoperate.

But several access equipment vendors have formed an industry standards group called the Bandwidth-On-Demand Interoperability Group, or BONDING. BONDING aims to define a standard for inverse multiplexing to allow different vendors' equipment to work together.

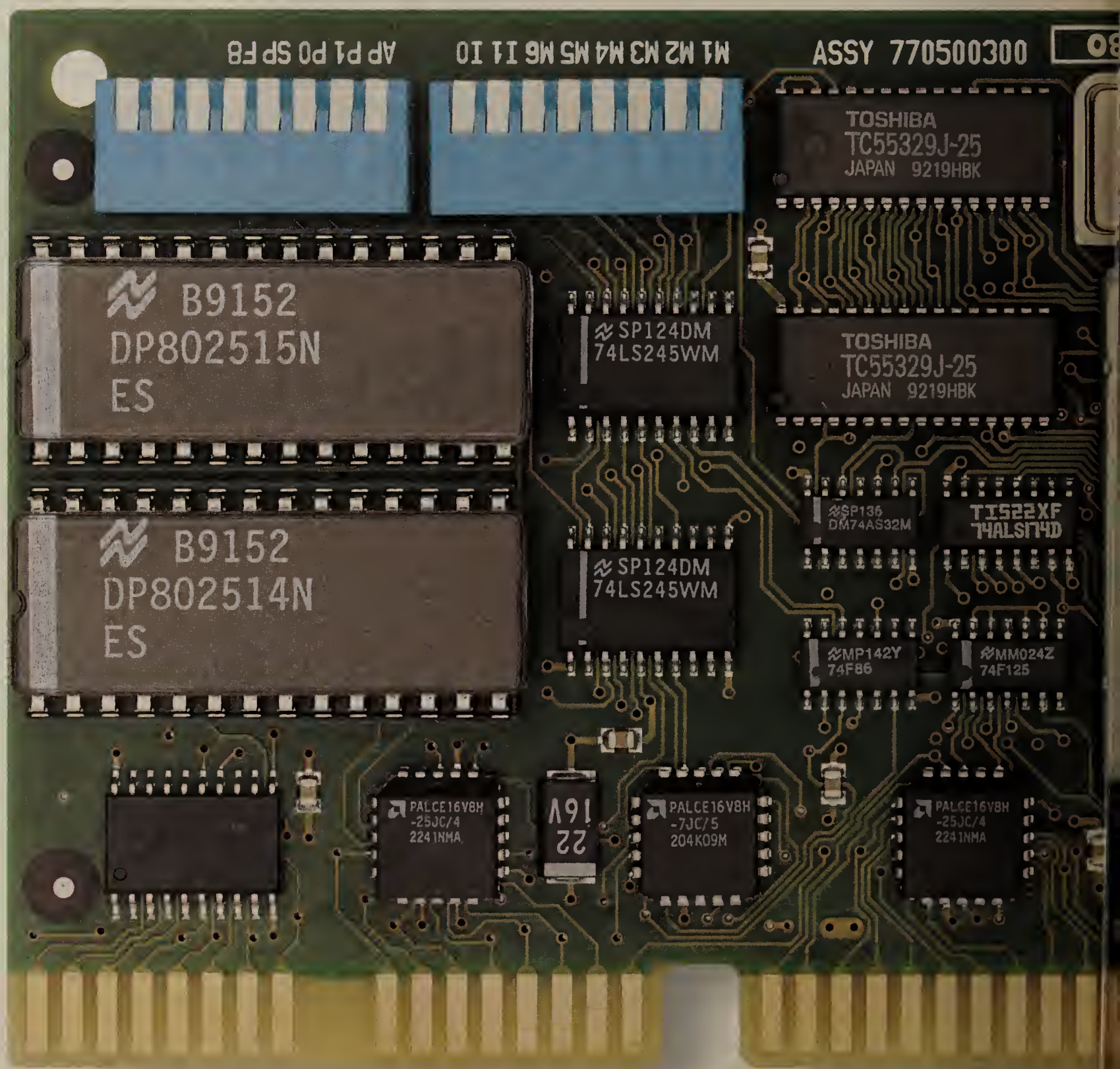
Finn is an associate with TeleChoice, Inc.



In an ideal world,  
there would be a Token Ring adapter  
that's 100% IBM compatible and  
100% reliable. Guaranteed.



# Welcome to



## (For first-time visitors, \$349)

Until now, the Token Ring world was a small one indeed. You either bought IBM® or you took your chances with a less-than-ideal substitute.

Now there's the first true alternative for all your PCs: Introducing the new TokenLink® III 16/4 adapters from 3Com.

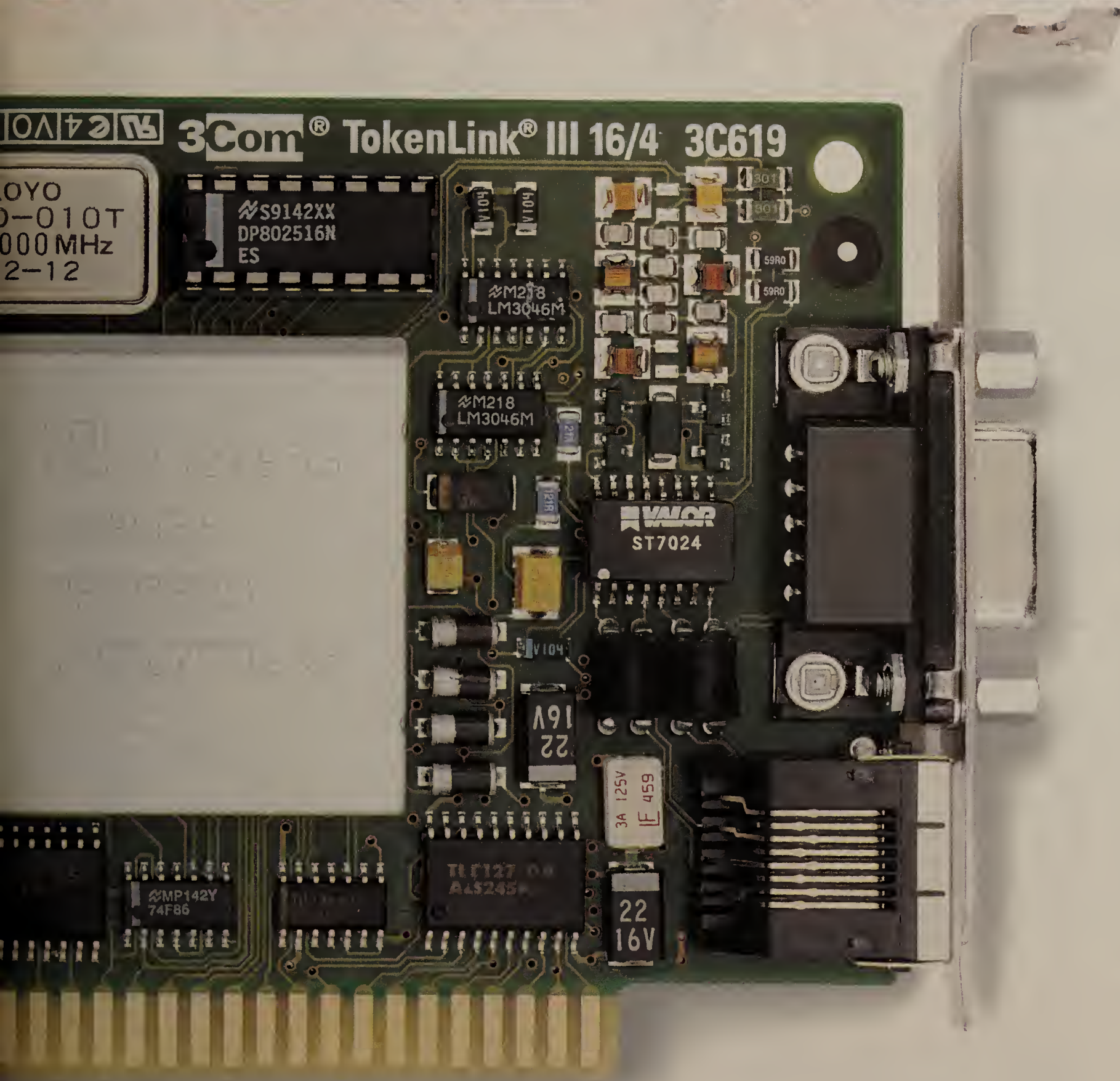
TokenLink III adapters are guaranteed 100 percent IBM compatible. Or your money back.

TokenLink III adapters use the IBM designed and manufactured TROPIC™ chip for full compatibility with all IBM applications. And they come with a universal boot PROM, so you can download existing IBM drivers from all the popular network operating systems. There are TokenLink III adapters for 32-bit EISA, 16-bit ISA, and 16-bit Micro Channel® machines. And they work with shielded twisted-pair, or even with unshielded twisted-pair at 4 or 16 Mbps.

And if you think that an alternative to IBM



# to our world.



needs to be as expensive as IBM, you're in for a pleasant surprise.

For a limited time you can install your first TokenLink III adapter for just \$349—a greater than 50 percent discount off the already low list price.\* And as with the rest of 3Com's four million installed adapters, you get unquestioned reliability. TokenLink III adapters even come with a lifetime warranty. And they're part of 3Com's full line of Token Ring products, from adapters to internetworking.

To learn more about 3Com's TokenLink III adapters and the special price offer, just call us at 1-800-NET-3Com. And find out how 100 percent IBM compatible can also be 100 percent safe.

\*\$349 offer limited to one adapter of each bus type per customer site, please. © 1992 3Com Corp. (408) 764-5000. 3Com and TokenLink are registered trademarks of 3Com Corp. IBM and Micro Channel are registered trademarks of International Business Machines Corp. TROPIC is a trademark of National Semiconductor Corp.



# Switched digital services: RBHCs

Company	Telephone	Service	Speeds			Interfaces supported					Service type			Fees			Volume discounts
						Non-ISDN		ISDN						Installation	Per-line service	Usage per minute	
			Subrates	56K	64K	Two-wire	Four-wire	Single B	BRI	PRI	Centrex add-on	Std. business add-on	Stand-alone				
Ameritech	(800) 242-8580	ISDN Centrex	✓	✓	✓				✓		✓			\$120	\$16+	(1)	✓
		Ameritech ISDN Direct	✓	✓	✓				✓			✓		\$135	\$23.50	(1)	✓
		Ameritech ISDN Prime	✓	✓	✓	✓	✓			✓	✓			\$2,000	\$450 and T-1 charges	(1)	
		Public Switched Data Service	✓	✓		✓							✓	\$525	\$83	3 cents	✓
Bell Atlantic Corp.	(703) 974-1719 (301) 236-3187	IntelliLinQ-BRI	✓	✓	✓			✓	✓		✓			\$37+	\$10+	5 cents	
		Switched 56 Kilobit Service		✓			✓						✓	\$725	\$150	14 cents	
BellSouth Corp.	(800) 428-4736	AccuPulse	✓	✓		✓							✓	\$700 - \$1,200	\$60	12 cents 1st min., 10 cents additional min.	
		ESSX ISDN	✓	✓	✓			✓	✓		✓			\$150 - \$300	\$35 - \$60	Voice	✓
		ISDN Basic Exchange Service	✓	✓	✓			✓	✓		✓	✓		\$30	\$10	Voice + 7 cents	
Nynex Corp.	(914) 644-5719 (914) 967-3633	ISDN Primary Service	✓	✓	✓					✓			✓	\$750+	\$332.25+	Voice + 7 cents	
		Switchway Service	✓	✓		✓	✓						✓	\$404.90+	\$82.35	Voice + 7 cents	
		Switched Digital Service 56	✓	✓		✓	✓						✓	\$500	\$45	Voice	✓
Pacific Telesis Group	(800) 995-0346	Cenpath	✓	✓		✓					✓			\$100	\$39	Voice	
		Centrex IS	✓	✓	✓				✓		✓			\$150	\$13.85	Voice	
		Primary Rate	✓	✓	✓					✓		✓		\$1,500+	\$545+	Voice	✓
		ISDN Smart Trunk	✓	✓	✓					✓			✓	\$1,540	\$1,556	Flat rate	
Southwestern Bell Corp.	(314) 235-9800	ISDN Plexar	✓	✓	✓				✓		✓			(1)	(1)	(1)	✓
		Microlink I	✓	✓		✓							✓	\$700	\$100	12 cents 1st min., 10 cents additional min.	
		DigiLine Service (ISDN Single Line)	✓	✓	✓			✓	✓		✓		✓	\$154+	\$38.25+	Flat monthly rate service	
		SwitchNet 56	✓	✓		✓	✓						✓	\$150 - \$200	\$50 - \$89.30	7 to 12 cents	
US West, Inc.	(303) 965-7004	PC/Phone	✓	✓	✓			✓	✓		✓			\$70 - \$75	\$75 - \$85	Flat monthly rate service	
		ISDN Basic Rate Service	✓	✓	✓			✓	✓		✓		✓	(1)	(1)	(1)	
		ISDN Primary Rate Service	✓	✓	✓					✓	✓		✓	\$1,000 - \$1,200	(1)	Flat monthly rate service	

FOOTNOTES:  
(1) = Individual case basis

SOURCE: TELECHOICE, INC., MONTCLAIR, N.J.

(continued from page 44)  
access. If a customer does not want to invest in ISDN, they can use Nx solutions to aggregate non-ISDN 56K bit/sec channels to fulfill their application needs. Additionally, MCI provides non-ISDN-based switched T-1 and T-3 services.

Where ISDN is not required for switched data, some users are installing it anyway after finding that ISDN can support many applications — including voice, switched data-oriented applications — as well as specialty operations, such as ANI-driven computer integrated telephony and advanced automatic call distributor applications.

However, despite the added functionality that ISDN promises, many users say the additional cost of an ISDN line is not supported by their applications.

"PRI brings very little to the table," says Arthur Greenfield, a communications consultant for Liberty Mutual Insurance Co. "You can do pretty much the same thing with a digital T-1 as a PRI. I don't have any applications that warrant the additional cost of a PRI."

But for international applications, it's a must. "We initially got involved in ISDN because it was a global strategy," says Jim Briggs, telecommunications manager at Eastman Kodak Co. based in Rochester, N.Y. "We have found ISDN to be very flexible and cost-

effective as an access technology for making switched digital international data calls."

The good news for users, outside of having choices, is that the cost of switched data services and equipment continues to decline. Most of the interexchange carriers have dropped prices as low as they are likely to go. MCI and Sprint offer switched 56K and 64K bit/sec services for the price of voice. AT&T offers 56/64K bit/sec service for a nominal amount over the price of voice.

Additionally, AT&T lowered the rate of its Switched 384 SDDN service by 25% this summer, making 384K bit/sec SDDN competitive with Nx solutions that provide an aggregate of 384K bit/sec bandwidth.

Carriers have encouraged switched data service use by lowering ISDN access charges. A recent promotion waiving installation fees just ended, and carriers have lowered the monthly fees for ISDN. For instance, AT&T has cut the monthly fee for ISDN PRI access to \$100 above the normal T-1 cost for customers with more than 10 PRIs.

But for local carriers, prices remain high. No carrier has yet slashed local switched service pricing, although there have been some moderate price cuts.

The good news in the local loop is that more services means more functionality for providing intra-LATA switched data solu-

tions and reaching interexchange carrier switched data services.

Finally, prices of customer premises equipment and other devices used to drive switched data are falling. Fierce competition in the access and videoconferencing equipment markets is lowering the cost of implementing applications that rely on switched data services.

Switched data is here to stay,

says David Bennett, director of telecommunications for Willis Coroon, an international reinsurer. "It's the greatest thing since sliced bread," he says. "Switched data allows me to provide capabilities on my network that I otherwise would not be able to afford using dedicated lines."

As the number of applications and users continues to increase, switched data will become a sta-

ple of most companies' corporate networks. ■

*Briere is president of and Langner is an associate with TeleChoice, Inc., a Montclair, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. They can be reached at (201) 746-0200.*

## Switched data stakes out its place

With the emergence of switched data services, frame relay, Switched Multimegabit Data Service and the continued popularity of traditional packet network services, customers have a broad number of choices to fill data needs.

Users should examine what kinds of applications they are planning for public data services, and then look at what kind of applications they will be using down the road.

If the initial application is something such as heavy LAN-to-LAN connectivity, one of the packet-based data services may be most appropriate. If plans include videoconferencing, it may make more sense to integrate those two applications on a circuit-switched data service, rather than use separate facilities.

Backing up dedicated corporate networks remains the most common use of circuit-switched data services. Such backup can make a big difference when trouble crops up.

Ascom Timeplex, Inc., of Woodbridge, N.J., was caught up in a recent Sprint Corp. outage. The firm uses a Sprint 128K bit/sec private line between its New Jersey and Florida operations.

Jim Naylor, Ascom Timeplex's director of telecommunications, says that when the private line between these sites went down, equipment at Ascom Timeplex's locations automatically dialed up two AT&T Software-Defined Data Network (SDDN) 64K bit/sec lines to replace the lost private line.

"We were able to restore service via switched backup without

the end users even realizing that service had gone out," he says.

Videoconferencing demand has also fueled the growth of switched data services. Its variable high-bandwidth needs and the need to reach sites off the corporate networks has made switched data an excellent medium.

New videoconferencing standards have helped fuel this growth. Today, most videoconference units comply with the H.261 standard for video compression, allowing videoconference systems of different vendors to communicate.

"We use switched data to connect both corporate and noncorporate locations through the off-network capability of SDDN," Naylor says.

— Mark Langner



# AT&T's BNS-1000 looks very promising to me.

Send me more information on how it improves Wide Area Networking.

Name \_\_\_\_\_

Job Title \_\_\_\_\_

Company Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_



**AT&T**

Network Systems

NW 11/9

(Mail this card today)





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**  
FIRST CLASS PERMIT NO. 1999 PHOENIX, AZ.

POSTAGE WILL BE PAID BY ADDRESSEE

**AT&T Network Systems**  
**505 North 51st Avenue**  
**Phoenix, AZ 85043**  
**Attn: Jim Ray**





# Promised LAN

## *Or, How AT&T's BNS-1000 Delivers Freedom To Wide Area Network Communication*

Networks are getting wider. Communication is getting harder. But AT&T's BNS-1000 Fast Packet Switch can make it all easier. Because it provides faster, more economical networking of frame relay traffic. The robust congestion-control mechanisms allow maximum network accessibility. Usable capacity is dynamically assigned to accommodate traffic fluctuations. And in the event of any disruption, the problem is automatically localized and traffic is re-routed. With our BNS-1000 you get speeds from fractional T1 up to T1 and dynamic bandwidth allocation. Plus, there's more flexibility and greater LAN interconnectivity due to strict adherence to standards. To learn more, call 1 800 338-3986. We'll help you get the most out of your LAN.

*AT&T and Bell Laboratories.  
Technologies For The Real World.*





# According To The Adams Study, Network Professionals' Best Read Publication Is *Network World*!

According to the recent Adams Company Information Technology Management Study, if their primary responsibility is networking, their best read publication is *Network World*. And they're picking *Network World* over any other LAN, PC, MIS or business publication.

Whether they are responsible for purchasing LANs, WANs or PCs or they have MIS or PC management responsibilities, if their primary job function is networking, first and foremost, they read *Network World*.

What's more, *Network World* was also ranked the publication with the highest weighted average issue audience among all networking publications studied. This means, more network professionals choose to read each issue of *Network World* than any other networking publication which they receive.

For more information on how to reach this powerful audience of volume buyers, call your *Network World* sales representative or Thomas J. Wilson at 800-622-1108 today.



Source: Information Technology Management Study,  
© 1992, The Adams Company.



## For More Information About These Products:

Use this coupon or Reader Service prepaid post cards inserted in the Nov. 16 and Nov. 30 issues. Circle the Reader Service Numbers of the ads that are of interest to you and complete the name and address information and

mail to: **Network World**

**P.O. Box 5090, Pittsfield, MA 01203-9828**

**Expires 2/28/93**

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Phone (     ) \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

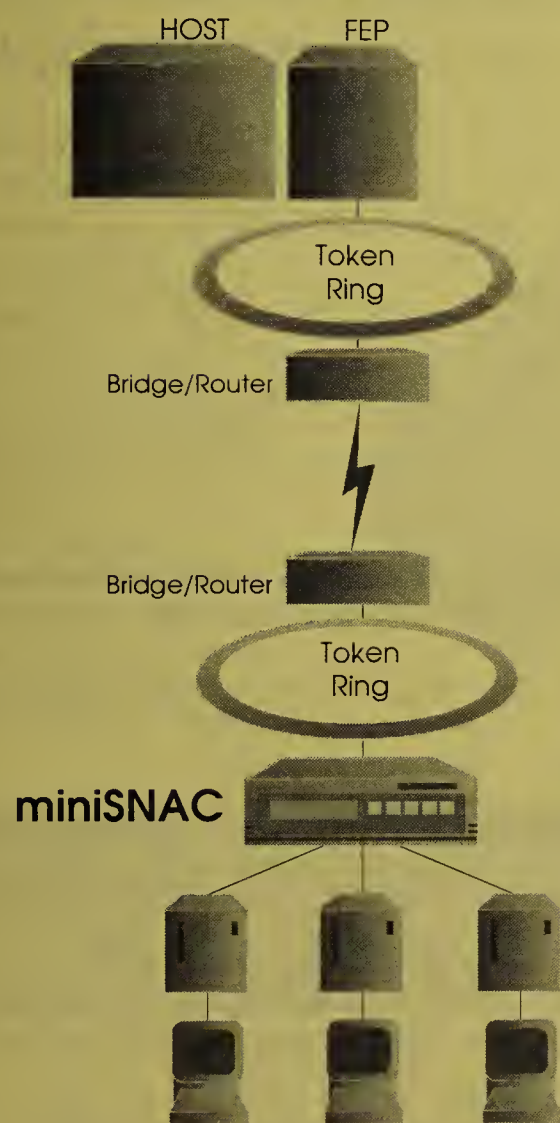
State \_\_\_\_\_ Zip \_\_\_\_\_

**NW 11/16/92**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128

### ACCESS CONTROLLERS

## Don't burden the router



With Sync Research's new **miniSNAC** you have an SNA oriented solution to internetworking SNA. The **miniSNAC** provides the SDLC to LLC conversion technology (that Sync pioneered) in a low cost, high performance 2 & 4 port package. The **miniSNAC** insures NetView compatibility through NMVT, RUNCMD, LPDA-2 and NPM, allowing you to operate and maintain your network in a manner your organization is familiar with.

So don't burden the router with a cost, performance, management and cultural overhead that can effect your critical SNA users. Choose the **miniSNAC**!

**800-ASK-SYNC**

Sync Research, Inc. 7 Studebaker  
Irvine, CA 92718 • 714-588-2070

**SYNC RESEARCH**

INTERNETWORKING SNA

Circle Reader Service No. 1

### TRAINING VIDEOS - NOVELL NETWORK

## TRAINING VIDEOS



Let Tim Gendreau, Certified NetWare Level II instructor and contributing author to the book *Inside Novell NetWare*, guide you on a step-by-step "hands-on"

video tour of Novell NetWare.

From the basics of networking to advanced security techniques, novice network users will unlock the mysteries of NetWare administration. In this unique video series, you'll learn how to create and maintain users, groups, print servers, queues and much more. No expensive and inconvenient classes, plus everyone in your office learns for a low price!

## NOVELL NETWARE 3.X SYSTEM ADMINISTRATION SERIES

As the President of Training Solutions, a Novell Authorized Education Center (NAEC) in Arizona, Tim Gendreau has taught hundreds of professionals the features and power of NetWare. With Tim as your "private tutor" you'll soon master your Novell Network.

## SYSTEM ADMINISTRATION SERIES

**VOLUME 1 - NetWare Basics, Directory Structures, & Drive Mapping** You'll learn what hardware and software components are needed for a network, how to log-in, how to create and maintain a NetWare directory structure as well as how to create, modify, and delete network drive mappings and search drive mappings. **70 Min. - \$125.00**

**VOLUME 2 - Setting-up Network Security** Covers the basic concepts of NetWare security including passwords, rights security, inherited rights masks, trustee rights, attributes & file server security. You'll also learn how to control access to areas on the network and the tasks that can be performed by certain user types. **67 Min. - \$125.00**

**VOLUME 3 - Menu & File Server Utilities PART 1** Explores the menu driven utilities of NetWare. You'll learn how to create and manage users and groups in NetWare's SYSCON utility as well as the supervisor options of SYSCON. **66 Min. - \$125.00**

**VOLUME 4 - Menu & File Server Utilities PART 2** Covers additional menu utilities like FILER, SESSION, DSPACE and

**SALVAGE.** Learn about file server utilities, NetWare Loadable Modules (NLMs) and Remote Console utility. **106 Min. - \$125.00**

**VOLUME 5 - Netware Printing** Discover the printing services that are available on NetWare. Learn about utilities like PCONSOLE, CAPTURE, and NPRINT, plus how to create, configure, install and maintain the NetWare print server and print queues. **83 Min. - \$125.00**

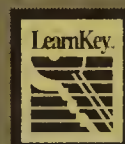
**VOLUME 6 - Login Scripts** Introduces NetWare users to System, User and Default login scripts. You'll learn order of execution, the commands to use in your login scripts and advanced tips for creating login scripts. **74 Min. - \$125.00**

**VOLUME 7 - Custom Menus** Find out how to customize the NetWare environment for your users. You will learn how to create and maintain custom menu's, rights needed to create and execute these menu's and how to execute them automatically. **33 Min. - \$125.00**

### Other Videos Available from LearnKey:

WordPerfect Series	Desktop Publishing Series
WordPerfect for Windows	Lotus Series
Windows Series	DOS

Credit Cards, checks, money orders, and purchase orders accepted. Add \$5 shipping per order, Utah residents add 6.25% tax. Mail or fax orders to:



**LearnKey, Inc.**

93 S. Mountain Way Dr., Rm 9  
Orem, UT 84058  
801-224-8210

**1-800-937-3279, FAX 801-224-8211**

**All 7 basic tapes \$695<sup>00</sup>**

### OTHER NETWARE VIDEOS

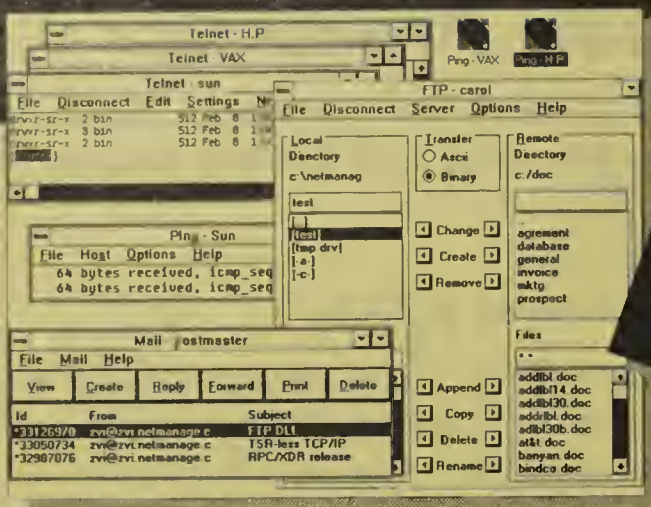
**NetWare 3.X Installation** It's important that every administrator know how to install the operating system in case disaster strikes. This tape covers the hardware and software requirements of the file server and work station. **69 Min. - \$125.00**

**Installing WordPerfect 5.1 on a Novell Network** Teaches the most efficient way to load and operate WordPerfect on NetWare. Eliminate many of the problems that stem back to the original installation. **101 Min. - \$125.00**

Circle Reader Service No. 2



# TCP/IP for Windows



**CHAMELEON™**

100% DLL  
NFS = RPC  
SNMP

**Requires only 6KB of base memory  
Implemented as 100% DLL (not a TSR)**

- All applications are both client and server
- Works concurrently with Netware, LAM Manager, Vines etc.
- Up to 64 concurrent sessions

## Applications:

TELNET (VT100, VT220), TN3270, FTP, SMTP/Mail, POP2, SNMP, Ping, Bind, Statistics, and Custom

## Developer Tools:

- Windows Sockets
- Berkeley 4.3 Socket
- ONC RPC/XDR
- WinSNMP API

## NEW! NFS Client & Server

For overnight delivery call:

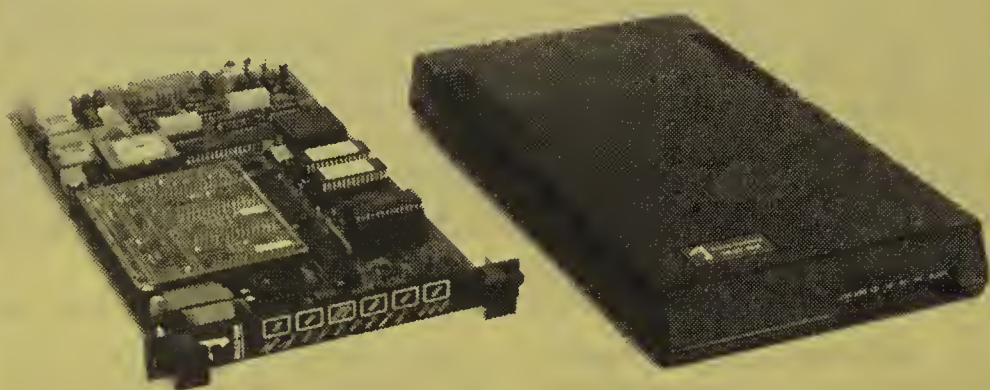
**NETMANAGE™**  
(408) 973-7171

NetManage, Inc.  
20823 Stevens Creek Blvd.  
Cupertino, CA 95014 USA  
Fax (408) 257-6405

Circle Reader Service No. 3

## V.32 bis MULTIMODE MODEMS

**WHEN YOUR LEASED LINE FAILS,  
WHEN SECURITY IS IMPORTANT,  
WHEN OFF-HOUR TOLL CALLS  
ARE SKY-HIGH...**



## YOU WISH YOU HAD AN AJ MODEM

**UNATTENDED AUTOMATIC DIAL BACK-UP (UADBU™) W/CLOCK CALENDAR CONTROL.** When a leased line fails or the signal quality deteriorates, UADBU™ (an Anderson Jacobson innovation) automatically restores the connection. Pre-stored information in the Clock Calendar prevents unnecessary and expensive off-hour toll calls. Number linking assures alternate site disaster recovery.

**COMPATIBLE WITH VIRTUALLY ANY MODEM** AJ Multimodems meet V.32, V.32 bis, V.33 and V.29 standards as well as V.27, V.22, V.22 bis and Bell 212/103. Synchronous dialing per V.25 bis is 1 standard for IBM AS/400 applications.

### MULTIPLE SECURITY MODES

We protect your system from unauthorized access. The Answerback/Callback, Operator and Supervisor Passwords features verify that the caller knows the password and is calling from an authorized modem.

UADBU is a registered trademark of CXR Corporation

**DATA COMPRESSION/ERROR CORRECTION** AJ Multimodems provide error-free data at the highest throughput (MNP 4/5, V.42/V.42 bis) with use of a 16 bit processor. Macworld tests rated AJ Modems highest in performance in data compression and low level tests.

**V.32 bis/V.42 bis with fax.  
Prices start at \$650.00**

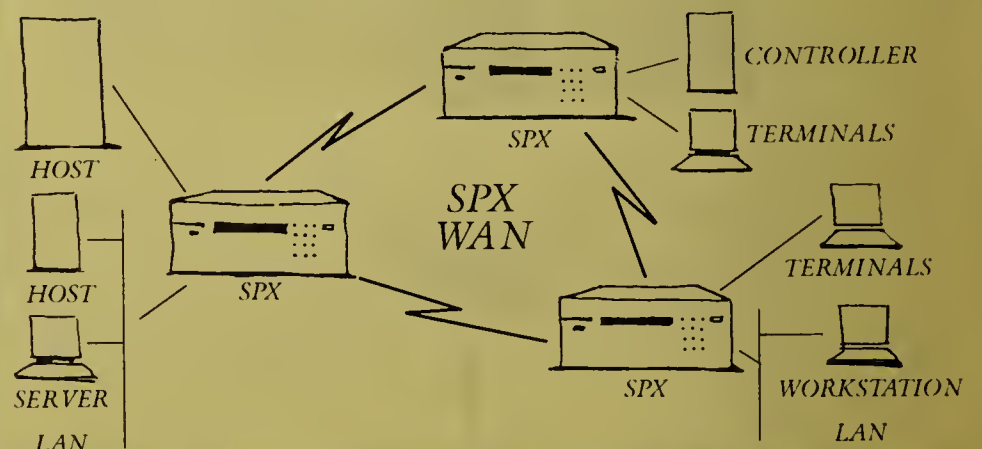
**ANDERSON  
JACOBSON**  
- A CXR Company -

521 Charcot Avenue  
San Jose, CA 95131  
Tel: (408) 435-8520  
Fax: (408) 435-1276  
Toll Free (800) 537-5762 ext.263

Circle Reader Service No. 4

## ACCESS MULTIPLEXER

## SPX: Intelligent Wide-Area Networking Multiplexers



**Cost-effective way to build point-to-point, star, and multipoint sub-T1 WANs for terminal-to-host and LAN internetworking.**

**NET** NETWORK EQUIPMENT  
TECHNOLOGIES

Call 800-388-4NET

Circle Reader Service No. 5

## ALARM SYSTEMS

**WAKE  
UP!**



When Network problems occur, you need to know ASAP. Dataprobe Alarm Systems provide automatic notification to a PC, terminal or printer as well as audible and visual indicators that help you respond fast.

Alarms at local or distant remote sites can be reported to one or more monitoring stations or to a personal pager.

Contact Dataprobe for complete information. Ask for our **ALARMING NEW PRODUCTS** catalog.

**dataprobe**

When Every Bit Counts

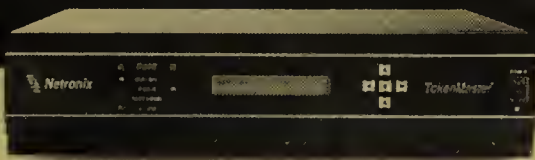
170 Coolidge Avenue Englewood NJ 07631  
Phone 201-569-6464 Fax 201-894-0939

Circle Reader Service No. 6



# THE ONE BRIDGE IBM WOULD LOVE TO BURN.

**NETRONIX**  
100% IBM Com-  
patible ♦ Higher  
Performance Than *Any* IBM Bridge ♦  
WAN Link Data Compression ♦ IBM  
LAN Manager and SNMP ♦



Downloadable  
Software/  
Flash Memory  
♦ LCD Display ♦ Rack Mountable ♦  
Less Than 30 Minute Installation  
♦ Two Year Warranty

**FREE 30 DAY EVALUATION**

Local Bridges Start at \$4690 ♦ Remote Bridges Start at \$5890  
To order with confidence or receive more information call:  
**1-800-282-2535 or 1-707-769-3300**



**Netronix**

Always 100% Compatible.  
Never Comparable.

A Subsidiary of AMP Incorporated

Circle Reader Service No. 7

## CABLE DIAGNOSTICS

## THE EASIEST POSSIBLE WAY TO TROUBLESHOOT YOUR LAN.

**QUICK SCANNER™** makes network troubleshooting a breeze. It's the first Scanner that's completely menu driven. All you need to do is turn it on, attach the cable to it and push a single button. In seconds it tells you where and what the problem is.

**QUICK SCANNER \$995.00**

- Easy to use menu-driven format
- Pinpoints faults in LAN cabling using TDR cable radar
- No technical jargon or complicated instructions
- Displays results in plain English (i.e. "Short at 78 ft.")
- Tests all twisted-pair and coax cables
- Monitors Ethernet network activity
- Performs standard tests with no user input

For more information about **QUICK SCANNER** and your free LAN Troubleshooting Guide, contact Microtest at 800-526-9675

©1992 Microtest Inc., 3519 E. Shea Blvd., Phoenix, AZ 85028, 602-971-6464 Fax: 602-971-6963



**MICROTEST®**

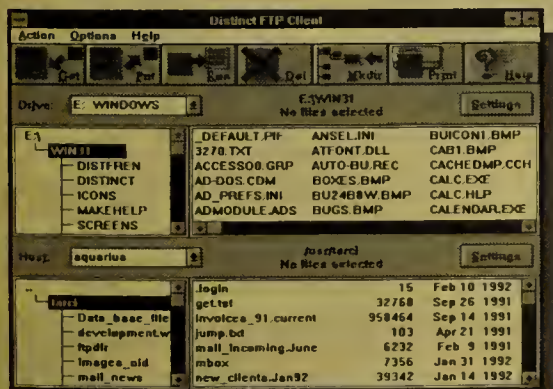
Circle Reader Service No. 8

## CONNECTIVITY SOFTWARE

## Distinct® TCP/IP™ for Windows™

**INTEGRATED NETWORK SOLUTION FOR MICROSOFT® WINDOWS™**

- **Telnet** - multiple and concurrent sessions
- **FTP** - drag and drop - client and server
- **Monitor** - Ping, Statistics, etc
- Menu driven Network Configuration
- TCP/IP protocol stack is **100% DLL** (uses only 5K DOS memory)
- Coexists with Novell, Banyan or LAN Manager at **no additional cost**
- Supports NDIS, ODI and Packet drivers
- Optional TCP/IP, RPC/XDR, FTP, Network Windows and Telnet Toolkit



**(408) 741 - 0781**

Fax: (408) 741 - 0795

**distinct**

P.O. Box 3410, Saratoga, CA 95070-1410

Circle Reader Service No. 9

## CONNECTIVITY SOFTWARE

## TCP/IP for Windows

easy to use and simple to install

*AIR For Windows runs concurrently with Novell® NetWare and other LAN Operating systems.*

- Full Windows Implementation.
- Includes Novell LAN Workplace TCP/IP Transport.
- Hardware Independence via open Data Link Interface (ODI) or NDIS.
- Support Ethernet, Token-Ring and ARCnet.
- Includes Berkeley socket interface.
- Optional TN3270, NFS Client and AIRMAIL for the Internet.
- Supports VT100, VT220 Terminal Emulation.
- File Transfer Protocol (FTP), Line Printer Redirector (LPR).
- Available in single and multi-user versions.



Through November 30, 1992 you may purchase a single copy of AIR for Windows for only \$99.00. Retail price: \$275.00. Just mention this ad and call:



All manufacturer's names or product names are registered trademarks of the respective manufacturer.

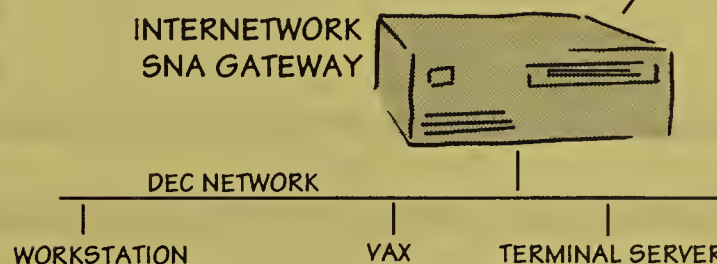
**SPRY, Inc.**  
**(206) 286-1412**  
1319 Dexter Avenue North  
Seattle, Washington 98109  
Fax (206) 286-1722  
Internet: sales@spry.com

Circle Reader Service No. 10

## DEC-TO-IBM

## SNA Host Access For LAT-Attached DEC Terminals

ETHERNET, TOKEN RING, OR  
SDLC TO SNA HOST



With Netlink's Internetwork SNA Gateway™, LAT-attached DEC terminals and printers can access SNA host applications and operate as full-function 3270 devices. Reduces costs while maximizing network flexibility...Eliminates parallel networks...Supports from 16 to 128 SNA sessions...Connects to IBM hosts via SDLC, token ring, or ethernet...Requires no VAX resources!

**Call 1-800-NETLINK to learn more!**

Circle Reader Service No. 11

**NETLINK**  
INC

## DIAL MODEM MANAGEMENT

## Dial Modem Management for the small user



Our new microMUM provides cost effective Network Management for users with as few as 8 modems.

**Features Include:**

- Local Reconfiguration
- On Line Audit Trail
- Busyout on Ring No Answer & loss of DTR
- Modem vendor independent
- Daily, Weekly & Monthly reports
- As low as \$80.00 per modem



**CDI**

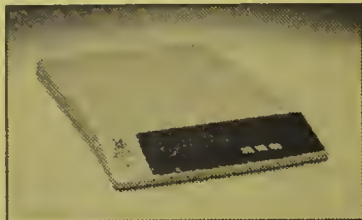
**Communication Devices Inc.**  
1 Forstmann Ct.  
Clifton, NJ 07011  
Phone 201/772-6997  
Fax 201/772-0747 • 800/359-8561  
Circle Reader Service No. 12



## THE DIGITAL NETWORKING LEADER

THE OFFICE-READY,  
INTELLIGENT DSU.

Our new DeskTop 500A Data Service Unit offers easy installation and diagnostic testing by nontechnical personnel at remote sites. Its compact, attractive design is just right for the office. A front-panel electronic display provides line speed, alarms, and test data at a glance.



No adapter cables needed; the DeskTop 500A automatically selects CCITT V.35 or EIA 232-D interface and all DDS data rates. For

easy order information, call the leader in digital networking at 1-203-792-0542, or toll-free at 1-800-777-4005.

General DataComm

WORLD CLASS NETWORKING

Circle Reader Service No. 13

## LAN-HARDWARE

## LAN Hardware Sale

PHONE TOLL FREE; 800-448-7420 OR FAX; 800-752-6958

ONE YEAR WARRANTY ON ALL HARDWARE

## ETHERNET

AQUILA 88 10BT (NEW).....	110	NOVELL NE1000 .....	90
AQUILA 16B 10BT (NEW).....	120	NOVELL NE2000 .....	110
3C501 .....	80	TIARA LCE .....	70
3C503 .....	118	WD 8003E .....	95
3C505B .....	265	WD 8003EP (NEW) .....	110
CONCENTRATORS (NEW) 12P 10BT .....	650	CABLE, T-CONN., TERMINATORS.....	CALL

## TOKEN RING

IBM T/R 4MB TYPE I (LONG).....	75	IBM MAU (8228) .....	325
IBM T/R 4MB TYPE II (LONG) .....	130	PROTEON MAU (8228) .....	200

## ARCNET

PC130 .....	60	EARTH ARCNET .....	35
PC130E .....	65	THOMAS CONRAD TC6042 .....	40
PS110 .....	125	8 PORT HUBS (NEW) .....	150
PC600WS .....	125	8 PORT HUBS (REFURB) .....	120

Ethernet • Arcnet • Token Ring • G-Net • Proteon • PC-Net • 10BT

WE REPAIR: COMPONENT (CHIP) LEVEL REPAIR OF LOCAL AREA NETWORK PRODUCTS BY QUALIFIED TRAINED TECHNICIANS

WE BUY USED AND/OR SURPLUS LAN HARDWARE

LANFIX inc.



SINCE 1985

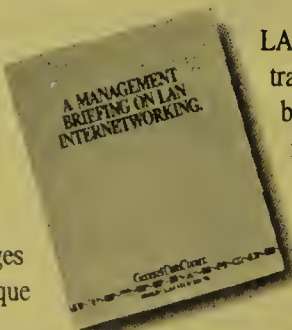
(FAX US YOUR LIST)  
1378 WEST CENTER ST.  
OREM, UTAH 84057

Circle Reader Service No. 14

## LAN INTERNETWORKING

FREE MANAGEMENT  
BRIEFING ON LAN  
INTERNETWORKING.

Interested in a new approach to LAN internetworking? Get this special General DataComm report on LAN Transport Management.™ This paper describes the advantages and disadvantages of traditional bridges and routers, and introduces a unique new approach from GDC.



LAN Transport Management offers traditional routing where required, bridging where desirable - and a new capability that provides routing, independent of all protocols, plus completely open network management. For your free copy, call 1-800-777-4005.

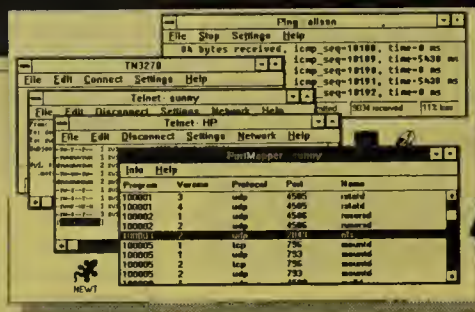
General DataComm

WORLD CLASS NETWORKING

WORLD HEADQUARTERS 1-203-574-1118 HONG KONG 852-526-5511 CANADA 1-416-498-5100 AUSTRALIA 61-2-956-5099  
UNITED KINGDOM 44-734-774868 EUROPE, AFRICA, MIDDLE EAST HEADQUARTERS 33-1-48133470 JAPAN 81-33-862-1730

Circle Reader Service No. 15

## NFS for Windows



CHAMELEON™  
100% DLL  
NFS = RPC  
SNMP

First and only NFS client and server for Windows  
First and only print client and server for Windows

- Network drives are mounted from within Windows
- Network printing in the background
- Up to 24 network drives
- Implemented as 100% DLL
- Requires only 6KB of base memory
- Included in ChameleonNFS

For overnight delivery call:  
**NETMANAGE™**  
(408) 973-7171

NetManage, Inc.  
20823 Stevens Creek Blvd.  
Cupertino, CA 95014 USA Fax (408) 257-6405

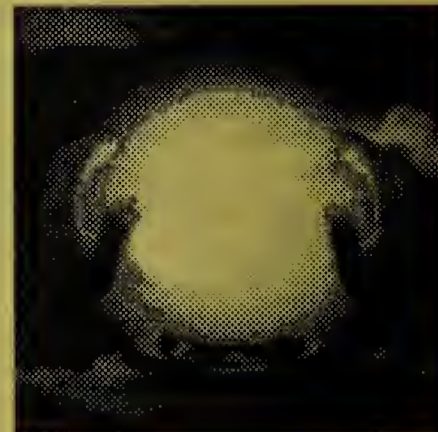
Circle Reader Service No. 16

## LAN/WAN ANALYZERS

IF THIS IS YOUR IDEA OF A  
PROACTIVE TEST SOLUTION,  
TAKE A LOOK AT TTC's NETLENS

## KNOW ABOUT IT AHEAD OF TIME:

- Portable, remote, and distributed analysis capabilities.
- True multitasking, with simultaneous capture and analysis on your LANs and WAN.
- Superior monitoring, protocol analysis, trending, and statistical capabilities.
- SNMP and full implementation of the RMON MIB.



**Telecommunications  
Techniques  
Corporation®**

A DYNATECH COMPANY

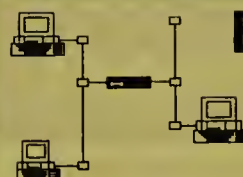
... EXPECT EXCELLENCE

For More Information, Call:

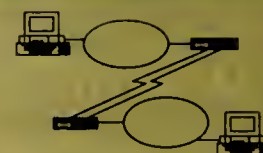
1-800-638-2049

Circle Reader Service No. 17

## LAN/WAN INTERNETWORKING



**Bridge The Gaps**  
in your  
Networking Budget



## Ethernet

Local starting @ \$1,695  
Remote starting @ \$2,145

- Media conversion 10Base5/2/T
- WAN links to 512 Kbps —or to T1 speed.
- Single, or Dual Link MULTI-point/Loadsharing.
- Bandwidth-On-Demand WAN Optimization.
- Powerful filtering capabilities.
- Full SNMP support.



## Token-Ring

Local starting @ \$3,695  
Remote starting @ \$3,650

- 100% IBM® source-routing protocol compatible.
- 4 & 16 Mbps with conversion.
- Single, or Dual Parallel Link Loadsharing.
- Auto backup & recovery.
- Extensive LAN & Link Statistics.
- Address, Protocol, & Custom Filtering.

**Develcon®**  
Quality LAN Internetworking

(800) 667-9333

Direct (306) 933-3300  
FAX (306) 931-1370

Circle Reader Service No. 18



## WE'LL PAY YOU \$500.00

EACH FOR THE TRADE-IN OF ANY MANUFACTURER'S DSU/CSU WITH THE PURCHASE OF THE NEWEST INTELLIGENT DSU/CSU FROM VERILINK, THE **ConnectT-1 PLUS**.  
**FEATURES INCLUDE:**

- ☐ Access to T1, fractional T1 and virtual private networks
- ☐ Drop and Insert
- ☐ 2 ports, expandable to 6
- ☐ Support of 1 or 2 T1 lines
- ☐ T1 performance monitoring
- ☐ Verinet 2 integrated remote management for ConnectT1 Plus and all Verilink ESF CSUs
- ☐ Verilink Value

WE'RE SO SURE YOU'LL BE SATISFIED, WE'RE BACKING IT WITH THIS FABULOUS OFFER. SO TURN IN THE OLD AND GET THE NEW, CALL NOW WHILE THE SAVINGS LAST.

**1-800-669-4278**



THE HELFRICH COMPANY

THE HELFRICH COMPANY 19782 MACARTHUR BLVD #310, IRVINE, CA 92715

Circle Reader Service No. 19

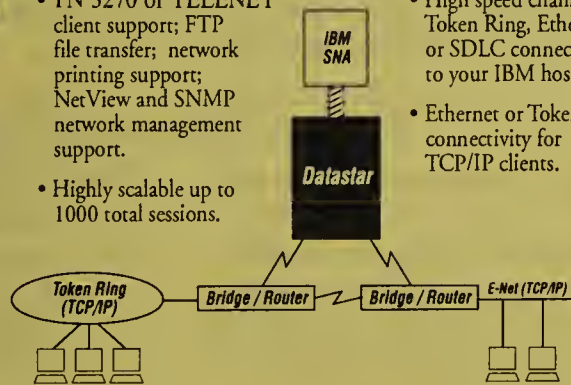
## MULTI-PROTOCOL GATEWAYS

## An "All-Together Better" Networking Solution

At Apertus, we recognize the growing demands you face to provide your TCP/IP-based users access to IBM mainframe resources. At the same time, we understand the expense, high CPU cycle requirements and administrative complexity of mainframe software solutions. That's why we've engineered the Datastar to give you a high performance, total system solution for accessing your IBM, SNA, and Biscync host resources from TCP/IP networks without the addition of expensive host software. Key features of the Datastar include:

- TN 3270 or TELENEX client support; FTP file transfer; network printing support; NetView and SNMP network management support.
- Highly scalable up to 1000 total sessions.

- High speed channel, Token Ring, Ethernet, or SDLC connectivity to your IBM host.
- Ethernet or Token Ring connectivity for TCP/IP clients.



For more information on making your network "all-together better," call 1-800-328-3998, ext. 30.



**APERTUS**

Circle Reader Service No. 20

## NETWORK CLIP ART

An Introductory Offer From **NETWORK WORLD**

Clip Art for Building Networks™

# NetDraw

**Because In Your Job, A Picture Is Worth  
Much More Than 1,000 Words.**

- The first clip art library created exclusively for networking professionals
- Over 170 professionally drawn symbols for Computing, WANs, LANs, Telephony Personal Computing, Patching and Cabling
- Available for DOS, Windows and Macintosh applications
- Symbols can be pasted into a variety of graphics, word processing, page layout and presentation documents
- Available at a low introductory price of \$99.95

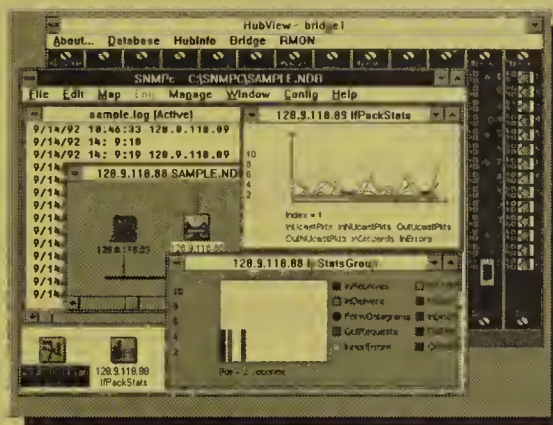
Price/availability subject to change. 30-day guarantee conditions: shipping/handling not refundable, product must be in original condition. Seal must not be opened on software. All trademarks and tradenames are properties of their respective owners.

Circle Reader Service No. 21

**Call 1-800-643-4668 to  
order your copy today!**

# SNMP Management

Packed with features, and only \$495, **SNMPc™** is the smart choice for Windows™ Network Management.



- Hierarchical Maps
- Node Discovery
- Generic Hub Display
- MIB Compiler
- MIB Table View/Edit
- Event Action Filters
- Remote Alarms
- DDE/API Interface
- Supports any TCP/IP

**30 Day Guarantee, 1 Year  
Free Update, and much more...**

**1-800-331-SNMP**

Fax 408-252-2379



**Castle Rock  
Computing**

20863 Stevens Creek Blvd. Suite 530 Cupertino, CA 95014

Circle Reader Service No. 22

## PROTOCOL ANALYZER

## Introducing the INTERVIEW®70 Series Powerful Protocol Analyzers in a PC

The INTERVIEW® 70 Series, which includes the INTERVIEW 70 and 72 models, sets new standards in flexibility and value for protocol analyzers in PCs. Available pre-installed in laptop platforms or as full-size card kits, the INTERVIEW 70 Series puts the power of an AR protocol analyzer into a PC.

Features include:

- X.25, SNA, BSC and Async
- Real-time data capture, trace, statistics, and emulation
- RS-232, V.35 and X.21 interfaces
- Automonitor

For more information about our 30-day free trial or demonstration disk, call today.

**1-800-368-3261**

**TELENEX**  
CORPORATION  
A UNIT OF GENERAL SIGNAL

**AR Test Systems**

7401 Boston Boulevard  
Springfield, Virginia 22153

Phone: 703-644-9190 • Fax: 703-644-2507

Circle Reader Service No. 23

## SEMINARS

## ARE YOUR LANs SECURE?

# NETWORK WORLD TECHNICAL SEMINARS

**LAN SECURITY SEMINAR** Attending will help you...

- Understand the scope of the LAN security problem
- Assess your network's areas of greatest liability
- Identify gaps in your network security
- Understand network operating system security and much, much more

With eight convenient seminar dates and locations this one day intensive seminar will give you new knowledge, ideas and tools to make you and your networks more effective. Registration fee is \$350 which includes luncheon, breaks and reception.

Circle Reader Service No. 24

**TO REGISTER  
CALL 800-643-4668**

**OR FOR A COMPLETE  
SEMINAR OUTLINE,  
DIAL OUR AUTOMATIC  
FAX-BACK  
INFORMATION LINE!**

**800-756-9430**

**When prompted  
request item #30**



## PORTABLE SOURCE & OBJECT CODES AT COMPETITIVE PRICES !!!

Supports:

- CPI-C Interface
- Control Operator Verbs
- Basic & Mapped Conversations
- Multiple/Parallel Sessions
- Dependent/Independent LUs

- PU types 2.0/2.1 for LU 6.2
- Concurrent operation with other LU types
- Available on DCCLC/DCCHP controller cards, but can be ported to other cards.
- We assist in porting and application development
- Comes with user-friendly configuration utility, and can be configured at run-time too!
- Also available X.25, 3270, LU 0, SNA PAD

For sample code and information, contact:

**DIGITAL TECHNOLOGY INC.**

(617) 229-9797 (Phone)

(617) 229-7979 (Fax)

Circle Reader Service No. 25

## SNA INTERNETWORKING

## Netlink's SDLC Link Server.<sup>TM</sup> Now, An Even Better Way For SNA.



- Connect SDLC devices to token ring or ethernet LANs.
- Convert SDLC data to LLC2.
- Transport SNA across your internetwork.
- Merge parallel networks; reduce costs.
- Improve network performance.
- Manage via IBM's NetView<sup>®</sup> or our new In/View<sup>TM</sup> program.

Call 1-800-NETLINK!

**NETLINK**  
INC.

Circle Reader Service No. 26

## SWITCHING &amp; PATCHING

## CONNECT WITH Spectron SWITCH/PATCH



There's no better value than Spectron for on-line monitoring, test access, network reconfiguration, and A/B switching.

Features include:

- Universal chassis that permits intermixing of interfaces
- Integral audible and visual alarms
- Remote monitoring, switching and alarming

For more than twenty years network managers have been entrusting their network connections to Spectron switching and patching products. In data centers throughout the world, Spectron products have proven themselves reliable over millions of hours use and countless operations.

To get more information about Spectron switching and patching products, call or write

Call 1-800-222-0187

**TELENEX**  
CORPORATION  
A UNIT OF GENERAL SIGNAL

Spectron Tech Control Products  
13000 Midlantic Drive  
Mount Laurel, NJ 08054

Circle Reader Service No. 27

# HAND-HELD T1 TEST SET



Perform in-service and out-of-service testing on T1 equipment, circuits and span repeaters.

- Clock and frame slip analysis
- Measure T1 frequency level and simplex current
- Automatic configuration of line code, framing and pattern
- Generate and respond to in-band and T1.403 loop codes
- Full DSO drop and insert monitoring and testing
- Measure channel level and frequency

Now, with these expanded features:

- 56xN and 64xN Fractional T1 (FT1) testing
- Pulse Shape Analysis
- T1.403 (T1E1) Control and Monitoring

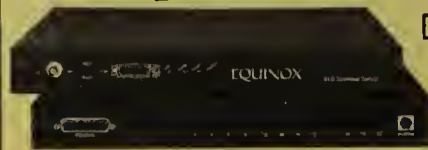
**Electrodata, Inc.**  
23020 Miles Road  
Bedford Heights, Ohio 44128-5400  
(216) 663-3333 TWX: (810) 427-2280  
FAX: (216) 663-0507

Call Toll Free 1-800-441-6336

Circle Reader Service No. 28

## TERMINAL SERVERS

## Save on modem, printer and terminal connections with Equinox 8 & 16 port Ethernet terminal servers



Don't compromise performance or features for DEC and UNIX connectivity! ELS-8 and ELS-16 dual protocol terminal servers deliver blazing performance at the lowest cost per seat. Our custom RISC processors drive all terminals at top speed without degradation. From Equinox — the async connectivity experts.

## ELS-8 &amp; 16 Standard Features:

- ☐ TCP/IP support includes Telnet, rlogin, DNS
- ☐ Full DEC LAT, DECserver compatibility
- ☐ Built-in high speed parallel printer port
- ☐ Flash ROM simplifies up-grades, facilitates quick recovery from power outages
- ☐ Switchable thick & thin Ethernet
- ☐ Full modem control support on all ports
- ☐ Drives all ports @ 38.4 Kbps simultaneously
- ☐ 3-year warranty
- ☐ Low price (including software) **ELS-8** (8 serial ports plus 1 parallel port): \$1895
- ELS-16** (16 serial ports plus 1 parallel port): \$2395

**EQUINOX**  
800/275-3500

Circle Reader Service No. 29

## TOKEN RING

HOTTEST  
NEWS  
on the  
TOKEN RING  
market

RAD'S got RED-HOT Products  
for 4 and 16 Mbps Token Ring!  
An extensive range where  
you'll find EXACTLY

what you need!

### Widest variety of:

- ACCESS UNITS
- BRIDGES
- MODULAR HUBS
- TESTERS
- REPEATERS
- FIBER
- INTELLIGENT MANAGEMENT

**RAD**

From the growing  
Rad family.

data communications inc.

Fax: 201-529-5777

SO CALL  
RAD'S HOTLINE TODAY  
for Sizzling Solutions to all your  
Token Ring Needs:

201-529-1100

Circle Reader Service No. 30



# 3274 + RA1200 = 3174



- Dedicated hardware that uses the IBM Token Ring chipset.
- Remote configuration with *standard* Telenet and TCP/IP.
- Network Management — supports both Netview and SNMP.
- Reliable — eliminates single points of network failure.
- Two ports — supports up to ten 3274s in multi-drop mode.
- Multiple unit pricing as low as \$1,800 per unit.

**RING**  
ACCESS

957-R INDUSTRIAL ROAD, SAN CARLOS, CA 94070 • TEL (415) 592-5853 • FAX (415) 592-5841  
Circle Reader Service No. 31

## DATA RACE Announces Multiplexer Breakthrough

NEW Voice/Fax/Data Multiplexer saves end-users tens of thousands of dollars

By Paul Longoria

SAN ANTONIO, Texas — If you can say yes to the next two questions then you may be in for a pleasant surprise!

1. Do you have remote computer users that need access to your LAN, mini, or mainframe?
2. Would you be interested in eliminating a substantial portion of your expensive long-distance telephone charges?

### Powerful, New Technology

Now, thanks to the emergence of a powerful new class of multiplexers, you can save up to \$6,000 per user per year in operating and line costs AND save up to an additional \$23,712 per year in long-distance charges for each phone line you replace!

**“Our company was wasting \$83,712 a year without DATA RACE’s MACH DS Mux”**  
— MIS Manager

### Be A Budget Hero!

With today's economic climate, corporate management will be pleased with Data Communication Managers that use this affordable, new technology as an easy, fast way to save on tight budgets.

### New Industry Leader

DATA RACE, a long-time price/performance leader in the statistical multiplexer field, is introducing the industry's most cost-effective, high performance Voice/Fax/Data Multiplexer series. From 8 to 64 ports, the new MACH DS multiplexers include these 5 important features:

1. Toll-Free Voice and Fax
2. Up to 3 Voice channels per link
3. Multiple Digital or Analog links
4. Connects to existing facilities
5. Pays for itself in months not years!

### Free, No Risk, 30-Day Trial

For a limited time, DATA RACE is offering a FREE savings evaluation survey and a FREE 30 day no-risk trial to qualified users. For details call 1-800-329-7223

DATA RACE, 11550 IH 10 West, San Antonio, Texas 78230

Circle Reader Service No. 33

## Solve Your Video Networking Problems with LINK Products

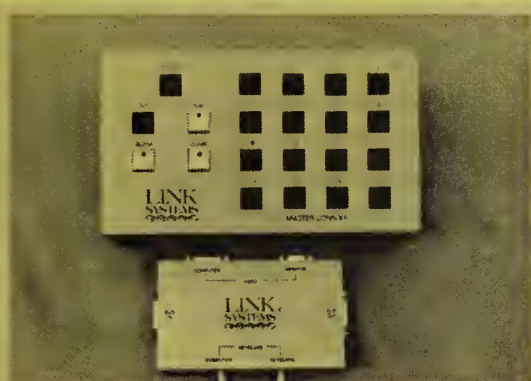
### LINK Video LAN System

PC Training Classrooms  
Computer Labs  
Video Control Centers

- Instructor has complete control of EVERY student PC from Instructor's PC via 100% Hardware LINK System.
- Full motion — Realtime Video
- Mono to 1280 x 1024 color
- Compatible with ALL software/Data LANS.
- IBM/Compatibles/MAC/Sun
- Single cable daisy chain bus configuration.
- 16 & 32 station Master Consoles

Applied Computer Systems, Inc., 3060 Johnstown-Utica Rd,  
Johnstown, OH 43031 Phone: 800/237-5465 Fax: 614/892-4838.

Circle Reader Service No. 32



### LINK Rack Control System

File Servers  
Communications Servers  
LANS/WANS Servers

- Operation of multiple PC's using one keyboard/mouse/monitor.
- 'Safety Boot' for power interrupt
- Rack Kit available

T1/  
FT1



**Magnalink**

TELCO SYSTEMS

## ETHERNET & TOKEN RING COMPRESSION BRIDGES

- ★ 4:1 Data Compression
- ★ Automatic Redundant Link
- ★ High-Speed T1/E1 Compression (3-6 Mbps over T1)
- ★ WAN Traffic Customization
- ★ Optional DES Encryption
- ★ Available for Frame Relay

Circle Reader Service No. 34

Phone: (617) 255-9400 FAX: (617) 255-5885

Telco Systems, Inc., Magnalink Communications  
63 Nahatan Street, Norwood, MA 02062

OPTIMIZED INTERNETWORKING SOLUTIONS

**Profits come from sales...**

**Sales come from leads...**

**Leads come from an ad in the ActionCenter!!  
and now**

**Generate additional leads with NetACCESS!**



NetACCESS, Network World's interactive advertising program, is available to ActionCenter advertisers. Your demonstration disk can be installed on Network World's Bulletin Board System, and run on-line, available for downloading by interested users. Network World will furnish advertisers with names and addresses of all those who have downloaded the disk.



For reservations and information call...

508-875-6400 or 800 622-1108

Joan Bayon Pinsky

Clare O'Brien



# NETWORKING MARKETPLACE

## DATA COMM

### SNA SOURCE LICENSE AT A FRACTION OF COMPETITORS' PRICE!

- Easily portable source code in C and assembly
- We assist in porting and application development

#### SNA HOST ACCESS

- LU 0, 1, 2, 3 and 6.2
- SNA/BSC/X.25 3270 Gateway Color & Extended Features Printer & IND\$FILE Support
- API for multiprotocol link router (SDLC, LAPB, ASYNC, BSC)
- Also available as products on inhouse Intelligent communications controllers on ISA/EISA bus

Contact:

**DIGITAL TECHNOLOGY**  
**617-229-9797**

SAVE 50% & MORE  
ON MOST PRODUCTS

#### BUY/SELL/NEW/USED

Reconditioned With Warranty

Modems • Multiplexers • T-1 •  
CSU/DSU's • Channel Banks •

AT&T CSU/DSU NEW! ..... \$275  
T-1 CSU's ..... \$499  
T.P. 557 CSU/DSU 56Kbps . \$195  
Infotron T-1 Equipment ... 60% Off  
AT-T Channel Banks ..... \$3995  
Tellabs 440 and 445 ..... 50% off  
Newbridge Channel Banks. \$3995  
Omnimux 82 muxes-8 port.. \$695  
Stat Muxes 4,8,16,32, port.. LOW  
Ethernet Bridges NEW!..... \$1695

#### METROCOM

(800) 364-8838

or (713) 783-8838

FAX (713) 783-8832 24 HRS

## Frame Relay Concentrator

- Input 120 frame relay streams on 5 T-1s, CSU or DSX-1.
- Take out V.35 (to 2 M/s) or FT-1 frame stream.
- Transports X.25 or any HDLC protocol as frames.
- Only 5 rack units (5.25 in.) high, 12 in. deep.
- AC or -48 V dc power.

**800-521-2496**

**FastComm**

Communications Corp.  
Sterling, VA 22170

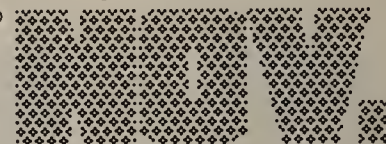


Call  
today  
for more  
information!

The Networking  
Marketplace  
Shannon Summers  
800-622-1108 x. 596  
or 508-875-6400

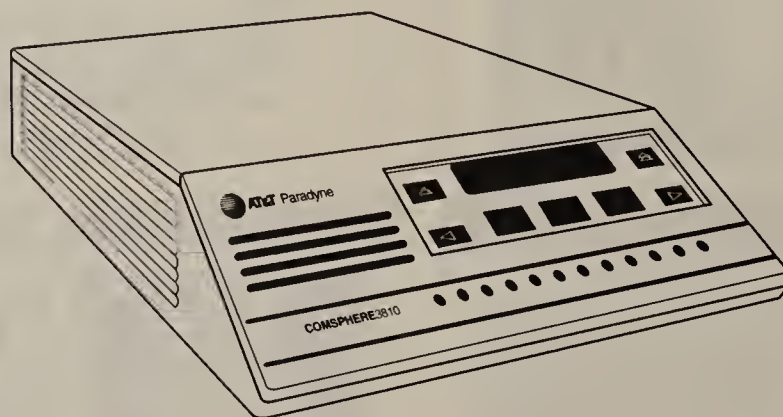
Prices good through 11/30

# SOURCELINE®



SPECIALS FROM AMERICA'S LARGEST INVENTORY OF TELECOM PARTS

## New! AT&T Paradyne



### 3810 Stand-alone Modem

Pec# 2270SA1 ..... **\$929**



AT&T Paradyne

Value Added Distributor

## NEAX 2400

p/n 240102N

New 16COTH 16 Circuit  
Trunk Card ■ For Mixed  
and High Density  
Applications

MFG List ..... **\$3,543**

SOURCE Price .... **\$1,799**

## New AT&T

p/n 3182BISMEN

### 7406 TSET

Display Telephone  
with Built-in Speakerphone  
Misty Creme Only

Only **\$399**



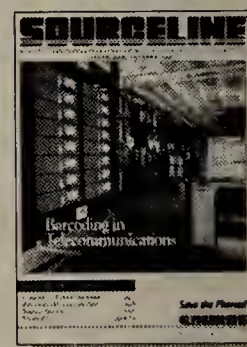
## SOURCE:

# The new "brand name" for the '90s.

WHAT'S BETTER than "brand new" parts? Try SOURCE Brand. Try our huge selection of over 25,000 different in-stock components: all brands, all models, new and re-certified by SOURCE. Then try our full-year warranty with next day replacement, barcoding, Saturday hours, and crack-of-dawn emergency service. For better than new, try the established brand that's been at it since 1971.

For additional specials, call  
**214-450-2700**

and ask about  
SOURCELINE,  
your free  
bi-monthly  
guide to the  
products of  
over 100  
manufacturers.



# SOURCE®

B R A N D

## Buy, Sell Or Announce Through Network World's Direct Response Section

Buying or selling communications-related products or services?  
Or do you want to announce an upcoming event or business opportunity?  
If so, Network World's direct response section is the right choice for you.  
You'll reach more than 150,100 communications/networking professionals  
all of whom are buying decision makers.  
And you'll reach them every week.

Find out just how effective and cost efficient Network World direct response advertising can be.



## TRAINING

SAA  
SNA • OSI  
DIGITAL SWITCHING  
TCP/IP • T1 • X.25  
FRAME RELAY  
LAN

**TELEtutor®**  
USING TECHNOLOGY  
TO TEACH TECHNOLOGY™

1-800-542-2242  
FAX (603) 433-2260  
CALL FOR CATALOG OF  
ALL OUR COURSES

### THE LEADING INTEROPERABILITY WORKSHOPS

Held at  
University of New Hampshire

- KNOWLEDGE OF INTEROPERABILITY IS THE NETWORK MANAGER'S BEST ALLY
- THE WORLD'S PREMIERE INTEROPERABILITY TEST FACILITY IS THEIR GREATEST RESOURCE
- INVEST 3 DAYS WITH US TO IMPROVE THEIR INTEROPERABILITY KNOWLEDGE AND INCREASE YOUR NETWORK PERFORMANCE FOREVER



For Pricing, Schedules and Information Call OTG SYSTEMS, INC.  
Telephone: 717.222.9100 • FAX: 717.222.9103

## NDIS Training

December 10-11, 1992—Boston  
Learn the intricacies of NDIS such as:  
control flow, NDIS driver design,  
initialization and binding, receive and  
transmit, NDIS data structures, and  
characteristics tables. Review tested  
driver code segments

DWB Associates specializes in NDIS  
device driver development, conformance  
testing, and offers drivers for the NE-1000,  
NE 2000, the Generic Model MAC driver,  
the Dull Layer Network Driver, HPFS  
Drivers and Unix Device Drivers.

(617) 341-3081

331 Page St., Suite 12  
Stoughton, MA 02072  
(617) 341-3081



## TELECOMM

**PUBLIC NOTICE**  
TO  
ALL AT&T PRIVATE  
LINE CUSTOMERS

(ACCUNET T-1.5, T-45, ASDS, DDS)

Discounts up to  
**57%**

on Monthly Line Charges

Huge Savings Available  
With This New Aggregated  
Program.

CALL FOR INFO  
1-800-722-2668



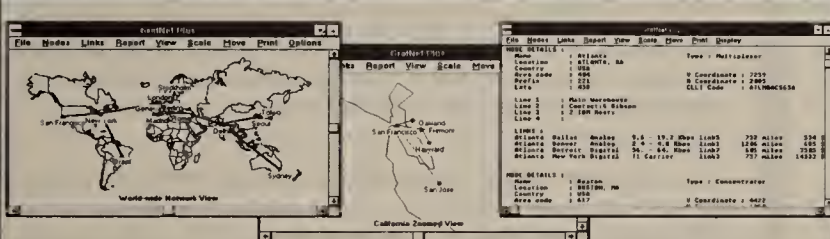
GLOBAL LONG DISTANCE  
MARKETING  
7051 W. Commercial Blvd  
Tamarac, FL., 33319

**MacWorld Expo**  
Special MacWorld  
Expo Show Issue  
- Dec 28/Jan 4

Closes: December 16  
Bonus Distribution

## SOFTWARE

**GrafNet Plus will display and  
document your network  
from Atlanta to Zurich...and more**



### Powerful graphics and extensive reports

GrafNet Plus is a powerful  
presentation system for displaying  
networks spanning the world. The  
software runs under MS Windows'  
user friendly, menu driven interface.

You may define network nodes by  
entering a phone number or through  
their Latitude and Longitude value.  
GrafNet Plus will automatically  
plot these on geographical  
maps of the world and its  
countries. It can read and update  
a screen display from changes made  
to a text file.

GrafNet Plus also maintains  
comprehensive data storage capability  
of network parameters presented as  
formatted reports. The network  
graphs and reports may be displayed  
on the screen or sent to a printer.

Extensive options exist for  
customizing the displays and print-  
outs. You can select screen colors,  
node symbols and colors, line styles  
and colors. You can specify the  
complete page and layout format for  
printing the displays.

GrafNet: \$450

GrafNet Plus: \$750 to \$1000

Call (408) 446-9598 today for  
information and a free demo disk.



**Network  
Dimensions, Inc.**

5339 Prospect Rd., #122, San Jose, CA 95129

**Interested In Advertising  
In Network World's  
Networking Marketplace?**

**We Have Sections For:**

Bids & Proposals, Computers,  
Consulting Services,  
Datacomm. Equipment, LANs,  
Real Estate, Seminars, Software,  
Training, Telecomm. Equipment

## LANs

**The largest selection of computer  
products and a new spirit  
of customer service.**

At America-Direct, we keep over 55,000 different products in inven-  
tory. We have everything you want—and at the lowest prices  
anywhere. And you'll *really* be pleased with the way we handle  
your order.

Compare these prices for example.

Then call us for the best price on what you're looking for!

Intel Ether Express 16T .....	125.00
Novell® 3.11 10 User .....	1375.00
SMC Elite 16 Combo 6 pk .....	940.00
SMC Elite 16T 6 pk .....	760.00
Novell 3.11 50 User .....	2750.00
Microsoft Word .....	295.00
Lotus 123 v.2.4 .....	325.00

Overnight delivery—available on everything we sell!



**America-Direct**

For the best in price and service, always deal Direct!

12008 W. 87th Suite 317, Shawnee Mission, KS 66215

**800-365-9886**

Fax 913-894-5077

In Canada 800-665-5434

## INSTALLATION SERVICES

**THE EXPERTS IN NETWORKING  
INTRODUCE A  
NETWORK OF THEIR OWN.**

### NATIONAL AFFILIATE NETWORK (NAN).

#### NAN Advantages

- Certified Installation Nationwide
- Services Coordinated By One Contact
- Maintenance And Troubleshooting
- Offer Lifetime Or Five Year Warranty

#### Experience Includes:

- IBM Type 1 and 2 • Coax • Ethernet
- Token Ring • Fiber Optic • IBM's COS
- DEC • Twisted Pair
- Many Others



NATIONWIDE DESIGN AND CADD SERVICES

**1-800-283-2821**

Cable Design  
and Installation



**WHEN YOU CALL, TELL 'EM  
YOU SAW IT IN THE  
NETWORKING MARKETPLACE!**



# NETWORKING CAREERS

## ISO's: TURBO CHARGE YOUR BUSINESS

Artel Communications, a leader in high-performance communications products, is recruiting Independent Sales Organizations for its new StarBridge™ TURBO Ethernet switch. TURBO is the only switch that offers both the full bridging capabilities and high performance needed by today's workgroups. If you're serious about networks, TURBO could offer you serious profit potential.

### WHAT WE NEED IN AN ISO:

- Understanding of Ethernet and networking
- An established organization with strong financials
- A track record with network customers
- No competitive products

### WHAT WE OFFER:

- Training
- Marketing programs delivering quality leads
- Aggressive fee schedules
- Significantly discounted demonstration units
- Cooperation of Artel sales organization
- Support from Artel's in-house telemarketing

### JOIN THE ARTEL ALLIANCE

The Artel Alliance program could be just the business opportunity you've been looking for. Call Ed Govoni today for complete information.

**1-800-525-2599**



Artel Communications, 22 Kane Industrial Dr.,  
Hudson, MA 01749 U.S.A. FAX: 508-562-6942

## TELECOMMUNICATIONS MANAGEMENT OPPORTUNITY

A leader in communications technology is currently seeking qualified candidates for a telecommunications management position in a west coast regional site facility.

The individual in this position will be responsible for directing all communications facility management services for a large west coast engineering and manufacturing site.

The ideal candidate will have a full range of prior telecommunications management experience which includes the successful planning and direction of all activities associated with communications site services for a large facility. At least 5 to 10 years of management experience, including responsibility for fixed assets, leases, maintenance agreements, negotiation and administration of vendor contracts, and personnel and resource allocation is required.

Additionally, the best qualified candidates will have demonstrated management leadership capabilities, with the vision and desire to expand into a regional service operation with profit and loss responsibility.

Fundamental to this position is a BSEE or related discipline in communications engineering, or a business or non-technical degree with equivalent technical experience. Additionally, successful candidates will have a minimum 5 to 10 years of management experience in the communications industry, which has included practical experience and technical knowledge in the areas of both voice and data communications, help desk and operations trouble reporting functions, moves, adds and changes for both telephone and data networks, and processing and distribution systems for all communications costs and value-added services.

This position offers challenging, diverse technical projects, a stimulating technical and business environment, opportunity for significant contribution to the growth of the business and a rewarding compensation and benefits program. For consideration, send your resume and salary history in confidence to: **NAS Confidential Reply, Three Gateway Center, Department 11 PG 40, Suite 1740, Pittsburgh, PA 15222.** Equal Opportunity Employer M/F/H/V.

### SALES/PRODUCT MANAGEMENT

Source, Inc., the largest and most experienced company in the buying and selling of new and recertified telecommunications equipment, has the following opportunities:

**ROLM Product Manager** - Responsibilities include management of the ROLM product line, including negotiating equipment purchases, assisting with sales, maintaining product information and sales training. Requirements include a related degree, the ability to engineer and configure ROLM systems, inventory management and basic merchandising skills.

**Inside Sales Professionals** - Responsibilities include developing new accounts while selling and servicing existing customers. Qualifications include a successful track record in sales of telecommunication products, a working knowledge of telephone equipment and a related degree.

We offer a competitive compensation package including base salary, incentives, 401(k) plan and other benefits. For confidential consideration, submit your resume including salary history to:

**SOURCE**

Human Resource Department  
14060 Proton Road  
Dallas, TX 75244  
EOE - Principals only

Telecommunications

### OPERATIONS MANAGER

Ensure reliable and timely delivery of services for the City of Seattle's phone, cellular, and data transmission systems. Direct staff in the operations and maintenance of fiber optic, copper, microwave, CATV, telemetry, and alarm systems. The emphasis is on productivity and quality in customer service. Starting salary is \$3,948 per month with excellent benefits. Position requirements include a related BA and 5 years of experience managing staff in the operations above, with background in Northern Telecom SL-1 and infrastructure planning preferred. Send your resume by 11/23/92 to:

Frank Emerson  
City Personnel  
Suite 1299  
Dexter Horton Bldg.  
Seattle, WA  
98104-1793  
AA/EOE

### Reminder:

**The Nov.  
23rd Issue**

**Closes  
Nov. 11th**

### UPCOMING SHOW ISSUES

#### DECEMBER 7th ISSUE

Bonus Distribution -  
Dexpo West

AD CLOSE: NOVEMBER 25

#### DECEMBER 28th/JANUARY 4th ISSUE

Bonus Distribution -  
MacWorld Expo

AD CLOSE: DECEMBER 16

#### JANUARY 11th ISSUE

Bonus Distribution -  
Network Boston

AD CLOSE: DECEMBER 30  
ComNet East Pre-Show Section  
Ad Close: December 11

**To advertise call  
PAM VALENTINAS  
NETWORKING CAREERS  
at 1-800-622-1108 today!**

**NETWORK WORLD**  
The Newsworld of Enterprise Network Strategies

Networking  
Careers  
ON-LINE



*Networking Careers On-Line* gives networking and communications job seekers a new way to learn more about career opportunities advertised in *Network World*. This free service, available through *Network World's On-Line Bulletin Board System*, was designed to provide you with the information you need to keep abreast of current opportunities and make informed career decisions. You'll see the text of an entire month's worth of *Networking Careers* employment opportunities as well as valuable additional background information on the advertising companies.

*Networking Careers On-Line* can be accessed 24-hours a day on the *Network World Bulletin Board System (BBS)*. Call today! **NETWORKING CAREERS ON-LINE** 508-620-1160 [300-2400 Baud (8-N-1)], 508-620-1178 [up to 9600 Baud (8-N-1)]



# Sybase details new tools

*continued from page 4*

will extend SQL Server capabilities across multiprocessor architectures, such as that in the NCR Model 3600. NCR will distribute the product on its own hardware, while Sybase will make it available on other Unix platforms.

Sybase's OmniSQL Gateway will enable a mix of relational databases to be integrated on the same client/server net. Based on Sybase Open Server, OmniSQL Gateway provides a single procedural language interface between SQL Server, IBM's DB2, and Oracle and Digital Equipment Corp.'s RMS databases. It also lets Sybase's stored procedures be used with non-Sybase data.

Users will be able to query and access data with no knowledge of its physical location on the network or the type of database that stores it, company officials said.

System 10's Replication Server, according to Sybase, is the first product to ensure reliable transaction processing and delivery of data in a distributed database environment. The company says it provides the type of securi-

ty and continuity of operation that more traditional two-phase commit features of other databases fail to provide.

When a breakdown occurs, the Replication Server allows the working components of the network to continue operating. Once the fault is fixed, it automatically synchronizes recovery of the affected databases.

In addition, Sybase's new Control Servers are designed to pro-

“Our customers told us this technology is no use unless they can control it.”



vide network management and control functions in a distributed environment. The servers handle automated systems administration, performance monitoring, configuration management and capacity planning, as well as backup and recovery. The family includes some existing Sybase products such as SA Companion.

“Our customers told us that all this advanced technology is no use unless [they] can control it,” Hoffman said.

New control server modules include SQL Monitor, which allows for remote monitoring and performance tuning of client/server applications; the Configurator, which was developed with NCR and works with Navigator Server to help users configure systems for optimal performance; and the Backup Server, which handles backup and recovery for large databases and allows for multiple simultaneous unattended backups and dumps.

Current Sybase users will receive the new SQL Server release and the new backup and recovery module as part of their maintenance contract. Pricing of other components will be announced after beta testing begins.

United Leeds Teaching Hospital in the U.K. recently trialed the System 10, which has proven fairly robust, said Ian Frost, head of system development at United Leeds. Thus far, it has handled the hospital's mix of databases well.

“It's been our objective to be an open systems house, both for hardware and software,” Frost said. “We've been able to build, within the Gateway, views of both Oracle and Sybase tables.

“As we build more and more databases, we can use all the PC-based tool sets we want with the gateway, which sorts out all the nonsense,” he said. ▀

# Carriers plot strategies

*continued from page 1*

free usage as a lure to switch to its 800 service.

According to industry experts, carriers are just warming up to the battle.

“These moves are just the beginning of the war for 800 customers,” said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. “We'll see much more as portability approaches.”

Today, 800 numbers are assigned to specific carriers, meaning customers have to give up their numbers if they change carriers. With portability, database technology being implemented by local carriers will allow customers not only to use one 800 number with any long-distance carrier, but also change carriers during different times of the day to take advantage of better rates.

AT&T currently owns about 80% of the \$7 billion 800 market, according to Federal Communications Commission figures. But experts say the increased flexibility provided by portability could cause a major reshuffling.

The competition created by 800 portability, for example, will encourage users to renegotiate deals and win other benefits.

Besides lower rates, Henry Levine, a telecommunications attorney here, advises corporations to try to get concessions such as better toll fraud protection or guarantees against 800 outages in exchange for long-term commitments.

However, Levine cautions customers that sign deals now to be careful to build in protection to account for possible price drops after 800 portability. Levine predicts that prices may drop by as much as 10% after portability.

“We caution customers against giving up now — for a tenth of a penny — a right that might be worth three cents [after portability],” he said. “We talk about index provisions or other protections to make sure the deal that looks brilliant in November doesn't look stupid in June.”

In addition to using 800 portability as a tool to renegotiate custom network deals, users such as NatWest see it as a way to increase network flexibility.

Patricia Ryan, vice-president of voice services for NatWest, said her company moved the bulk of its voice and 800 numbers to MCI in 1990 but was unwilling to give up its (800) NAT-WEST number. That number is printed on bulletin boards, stationery and brochures, and is used to support customer service, sales and other business calls.

“Of course, the 800 number

we would not consider disconnecting was 1 (800) NAT-WEST; I was truly stuck,” Ryan said.

NatWest customers and employees place about 200,000 calls per month to the 800 number, which is currently assigned to AT&T, Ryan said. That one number handles as many calls as NatWest's 50 other 800 numbers combined. By folding that 800 traffic in with the rest, NatWest will qualify for significant volume discounts, she said.

Besides cost savings, Ryan said she expects to get higher network reliability by moving to MCI. “Network performance that we've experienced on MCI has been very good,” Ryan said. “We haven't been affected by any major outages, whereas with AT&T, we did experience [800] outages when AT&T had the two big outages in the last couple of years.”

Ryan said consolidating traffic with MCI will also improve traffic management. NatWest splits traffic between two call centers, one in New York and one in New Jersey. With different carriers, “You can't do load sharing between call centers,” Ryan said. “If I give it all to MCI, they can split the calls by proportion, by time of day, and do load balancing, which right now, we can't do.”

NatWest's experience is a good example of the unprecedented options facing users. It is also an explanation for why carriers are mounting all-out campaigns to secure accounts and win new business.

## All-out campaign

MCI last week kicked off a major advertising campaign touting the benefits of 800 portability and urging customers to consider switching carriers. MCI is promising discounts or free service periods for customers willing to move their 800 traffic to MCI under a long-term contract.

“We're making it worth their while from a competitive pricing standpoint to [switch],” said Jonathan Crane, president of MCI's National Accounts unit. Crane declined to specify which types of discounts or other concessions MCI is willing to make but said the carrier will sit down with any customer to work out a deal.

AT&T officials are vowing to keep their customers and use portability as a way to move in on rivals' business.

Shaun Gilmore, director of marketing for 800 services at AT&T, declined to say whether AT&T might be considering promotions or incentives to win customers. However, he did say the carrier is in the midst of developing a marketing program and would not rule out promotions. “Promotions are a fact of life in the telecommunications industry,” he said. ▀

## Network World Advertising Sales Offices

### BOSTON

Thomas J. Wilson - Vice President, Sales  
Debra Mahler - Adm. Assistant/Sales  
(508) 875-6400/FAX: (508) 879-3167  
Donna Pomponi, District Manager  
Eleni Brisbois, Sales Assistant  
161 Worcester Road, Framingham, MA 01701  
(508) 875-6400/FAX: (508) 651-1853

### NEW YORK/N. NEW JERSEY

Joan Daly, Eastern Regional Manager  
Marlene Levis, Sales Assistant  
365 W. Passaic St., Rochelle Park, NJ 07662  
(201) 587-0090/FAX: (201) 712-9786

### S. NEW JERSEY/PHILADELPHIA/D.C.

Jacqui Mita DiBianca, District Manager  
Patricia DiBiase, Sales Assistant  
365 W. Passaic St., Rochelle Park, NJ 07662  
(215) 834-1390/FAX: (201) 712-9786

### CHICAGO

Dan Gentile, District Manager  
Anna Gabriel, Sales Assistant  
1011 E. Touhy Avenue, Suite 550  
Des Plaines, IL 60018  
(708) 297-8855/FAX: (708) 827-9159

### SAN FRANCISCO

Chris Curry, Western Regional Manager  
Sandra Kupiec, District Manager  
Lonnie Forbes, Sales Assistant  
Beverly Davis, Sales Assistant  
2083 Landings Drive, Mountain View, CA 94043  
(415) 691-0510/FAX: (415) 691-0525

### ATLANTA

Don Seay, District Manager  
Terry Sanders-Prentice, Sales Assistant  
1400 Lake Hearn Dr., Suite 330, Atlanta, GA 30319  
(404) 394-7509/FAX: (404) 255-5123

### LOS ANGELES

Richard Carlisle, District Manager  
Julie Olson, Sales Assistant  
18008 Sky Park Cir., Suite 145, Irvine, CA 92714  
(714) 250-3006/FAX: (714) 250-4881

### RESPONSE CARD DECKS/ACTIONCENTER/NETWORKING MARKETPLACE

Joan Bayon Pinsky, Sales Director/Prod. Class. Adv.  
Clare O'Brien, Acct Mgr, ActionCenter Response Cards  
Shannon Summers, Account Executive, Marketplace  
Eleni Brisbois, Sales Assistant  
(508) 875-6400/FAX: (508) 651-1853

### RECRUITMENT ADVERTISING

William Reinstein, National Sales Director  
Pam Valentinas, Senior Account Manager  
Christie Sears, Sales Assistant  
(508) 875-6400

### ADVERTISING OPERATIONS

Karen Wallace - Manager of Advertising Operations  
Linda Miller - Senior Account Coordinator  
Cathy McPherson - Advertising Coordinator  
Barbara Hill - Classified Account Supervisor  
(508) 875-6400

### NETWORK WORLD, INC. - An IDG Company

161 Worcester Road, Framingham, MA 01701  
(508) 875-6400/FAX: (508) 879-3167

Colin Ungaro - President/Publisher  
Mary Fanning - Dir. of Financial Operations  
Nanci Farquharson - Adm. Assistant

### MARKETING

Evilee Thibault - Vice President Marketing  
Carol A. Leonard - Marketing Specialist/Events  
Julianne Haskell - Mktg. Specialist/Promotion

### RESEARCH

Ann MacKay - Research Manager

### CIRCULATION

Richard Priante - Director of Circulation  
Renee Visconti - Fulfillment Manager  
Bobbie Cruse - Customer Service Rep.

### PRODUCTION

Ann Finn - Production Director  
Cheryl Rothman - Senior Production Coordinator  
Anne Nickinello - Imaging Manager  
Terri Mitchell - Production Assistant  
FAX: (508) 875-3090

### REPRINTS

Donna Kirkey - Reprint Manager/Graphic Designer

### LIST RENTAL SERVICES

Chip Zaborowski - List Rental Sales  
P.O. Box 9151, Framingham, MA 01701-9151  
(508) 879-0700

### INFORMATION SERVICES

Jeff Pennett - Director of Info. Services  
Jack McDonough - Manager of Info. Services

### DISTRIBUTION

Bob Wescott - Distribution Manager  
(508) 879-0700

### IDG

Patrick J. McGovern - Board Chairman  
Walter Boyd - President  
William R. Murphy - Vice-President Finance  
Robert Farmer - Vice Chairman

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 185 computer publications in more than 60 countries. Thirty million people read one or more IDG publications each month. Network World contributes to the IDG News Service offering the latest on domestic and international computer news.

## NETWORK WORLD



161 Worcester Road  
Framingham, Mass. 01701-9172  
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: \$5.00 a copy; U.S. — \$95 a year; Canada, Central & South America — \$110 a year; Europe — \$165 a year, all other countries — \$245 a year (air-mail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

*Network World* can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106.

*Network World* is distributed free of charge in the U.S. and Canada to qualified management or professionals who specify and maintain communications equipment, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

**PHOTOCOPY RIGHTS:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by Network World, Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus 50 cents per page is paid to Copyright Clearance Center, 27 Congress Street, Salem, Mass. 01970.

**POSTMASTER:** Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

Copyright 1991 by Network World, Inc. All rights reserved. Reproduction of material appearing in *Network World* is forbidden without written permission.



Reprints (minimum 500 copies) and permission to reprint may be purchased from Donna Kirkey, Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.  
ISSN number: 0887-7661.



# Bank buys into Cisco SNA plan

*continued from page 1*

company's six data centers here. Bancomer was purchased last year from the Mexican government as part of a large-scale privatization of the nation's core businesses. The outfit said it will migrate its hierarchical Systems Network Architecture net to a LAN internet that will support all current and future applications — the first key step in its move to become a leaner, more nimble operation.

David Gomez, Bancomer's assistant director of telecommunications, said the bank chose a router backbone to trim the slew of slow and expensive point-to-point SNA/Synchronous Data Link Control lines that currently

link regional sites with headquarters. Since the network will be handling all of the bank's mission-critical business applications, he added, it also needed to be fast, capable and reliable.

"The driving force was cost and market competitiveness," he said. "We looked at what we needed to do to be more cost-effective and decided we had to make the transition to token-ring LANs and internetworking."

The bank today relies heavily on IBM 3090 mainframes and fault-tolerant System 88 computers to support its automated teller machines, remote job entry terminals and teller terminals. The new LAN internet, which will be implemented in three phases during the next two years, will support those existing legacy SNA devices as well as future distribut-

ed LAN-based systems.

In Phase 1, 46 regional centers and five international sites will be linked to the six data centers here via 128K bit/sec satellite links. The bank will use 9.6K bit/sec microwave circuits for backup, as well as some 56K bit/sec lines. Gomez said the bank opted for satellite because reliable terrestrial digital facilities are hard to come by in Mexico.

During this first phase, Bancomer is also installing Sync Research SNA Network Access Controller/Token Ring Converters (SNAC/TRC) that will enable it to attach cluster controllers and asynchronous devices in regional offices to a Cisco router (see graphic, page 1). The router, in turn, will bridge the traffic across the net back to the host.

Gomez said Bancomer chose

Cisco largely because of the vendor's ability to convert serial SDLC data streams into 802.2 Logical Link Control 2 (LLC2) data streams. But Cisco has to overcome two flaws before its routers can effectively handle SNA traffic, so the Sync SNAC/TRC devices will act as an interim solution.

A shortcoming of the Cisco routers is that they can only ac-

commodate full-duplex devices, which is a problem because Bancomer has many older IBM half-duplex serial devices. In addition, the routers do not support Non-Return to Zero Inverted, an IBM encoding scheme often used with SDLC to derive clocking information.

Cisco said both features will be offered in a new software release due out by mid-1993, at which

# Offering forges connections

*continued from page 17*

LAN business," Hughes said.

Photonics previously competed in the wireless LAN business with a product called InfraLAN. But the company found infrared technology had weaknesses that made it unsuitable for building

full-fledged LANs, such as the inability for the signal to penetrate walls, he said.

"All the weaknesses of using infrared in the LAN market become strengths in the mobile computing market," Hughes said. For example, the inability for infrared to penetrate walls provides a high degree of security for the mobile user.

"The Infrared Transceiver and Collaborate were designed to facilitate a working environment which meets the needs of the mobile worker," he added. "We want to distinguish between wireless LANs and personal-area nets."

Collaborative PC, including the connective transceiver, will be available next month for \$250. □

# Letters

*continued from page 37*

ken can be forwarded.

However, some cell switches, including the one tested, are designed to assemble cells as soon as the DTE starts sending a frame and begin switching those cells before the total frame arrives. This reduces the time it takes before a given frame begins to arrive at its destination, even if the destination is intranodal.

Perhaps we could have been clearer about congestion control and throttling. We expected the switch to notify us of congestion before it reached a load level where it started to drop frames. What we observed was that the switches sent con-

gestion notices after they started dropping frames.

Furthermore, as the offered load increased past the point at which congestion notices should have started being issued, the actual throughput declined. We expected the actual throughput would stay the same or increase slightly.

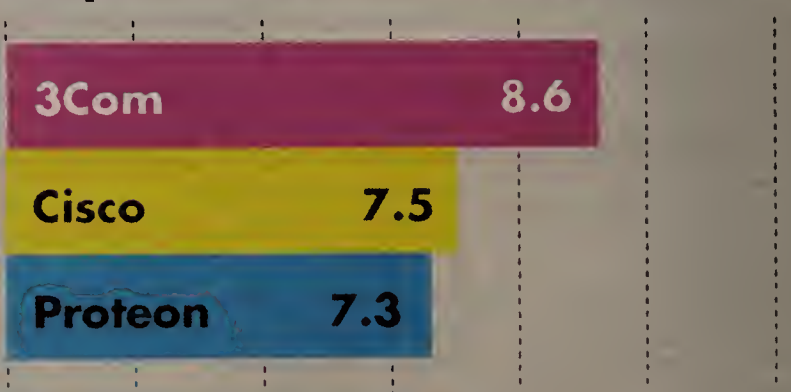
As for BECN monitoring, the test was based on sending data in only one direction. Therefore, we only monitored data being sent to a switch and wanted to discover the switch's ability to set the FECN bit when it became overloaded. We could have monitored BECN bits, but our limited time in the test lab prevented us from doing all the tests we wanted. □

# Surveys show we have the world's They also show you've

## Reliability



## Responsiveness of vendor service



In a recent Buyers' Scorecard Survey by Computerworld magazine, network managers rated leading bridge/routers. 3Com's NETBuilder® was rated Most Reliable, ahead of the market leader.

In fact, NETBuilder got the highest ratings in 11 of 14 categories. That included Value, Physical Design, and Responsiveness and Quality of Vendor Service and Support.



time Bancomer will swap out the Sync Research devices and instead employ the SDLC conversion capabilities of the Cisco router as well as the multitude of other protocols the router supports.

Gomez said the bank will make the switch primarily because of Cisco's ability to locally terminate both token-ring and SDLC traffic. That is, the router can ac-

In Phase 2, token-ring LANs will be deployed in more than 250 branch sites throughout Mexico to support current SNA and future LAN-based applications. The LANs will likewise be tied into the internet via the Cisco routers.

In the final phase, hundreds of additional sites in Mexico and abroad — which have no access to host resources — will be tied into the internet backbone.

**I**n Phase 2, token-ring LANs will be deployed in more than 250 branch sites throughout Mexico.



knowledge receipt of LLC2 and SDLC packets on behalf of the remote devices to which the packets are destined, thereby barring SNA acknowledgment and polling traffic from traversing and clogging the wide-area network.

"We needed [a router] that could support serial and token-ring attachment, and the fact that the Cisco routers can do dynamic conversion between serial and token-ring data is exactly what we were looking for," Gomez said.

Dick Boyle, program director at Gartner Group, Inc., a Stamford, Conn., consultancy, said the move away from hierarchical SNA nets to distributed LAN internets is something most large users should aim for. Those that do will be rewarded with greatly reduced wide-area line costs.

"SDLC is outdated," Boyle said. "The plan [Bancomer] has in place will provide them with a far more efficient net and better utilization of bandwidth." ■

## Cincom makes run with SQL

*continued from page 2*  
VMS databases.

"Our experience developing mainframe databases gives us an advantage over firms that grew up in the PC or Unix world, and are now trying to add high-performance functionality to what are essentially decision support databases," he said.

Some analysts think Cincom faces tough going. "The Supra Server engine is good-looking, but Cincom has its work cut out if it's going to capture 10% of the market," said Rich Finkelstein, president of Performance Computing, Inc. in Chicago.

Supra Server runs on most Unix operating systems as well as OS/2, Windows NT and several proprietary host systems, including IBM MVS and DEC's VAX/VMS. It supports a range of network protocols, including LU 6.2, the Transmission Control Protocol/Internet Protocol, the Network Basic I/O System and most LAN operating systems.

Users can migrate the database server from OS/2 to Unix, for example, without having to modify existing SQL applications, Hammergren said. In addition,

Supra Server is compatible with existing Cincom host databases, enabling users to integrate their legacy systems as they migrate to client/server computing.

Cincom's announcement was perhaps significant for what it did not contain, which is support for distributed updates, two-phase commits and stored procedures. Several analysts doubted whether Cincom could be a significant player in the Unix database market without these distributed database capabilities.

But Tom McLean, vice-president of Cincom's systems software division, said the firm plans to unveil a distributed version of Supra Server next quarter that supports two-phase commits.

"We are beta-testing Supra Server's distributed functionality right now, and it should be ready soon," he said.

Supra Server supports complex data types, including images, audio and video, and the flexibility of storing data in B\*Tree, hashed or indexed formats. The B\*Tree format is typically used for decision support systems, while hashed and indexed formats support rapid data access required in on-line transaction processing. It also supports multithreading and sym-

metric multiprocessing for high performance.

Hammergren said a unique feature of Supra Server is its ability to update a predefined set of data compiled from multiple database tables. A single command can automatically update a joined view of data. Most other databases require users to update database tables separately or write many lines of custom code.

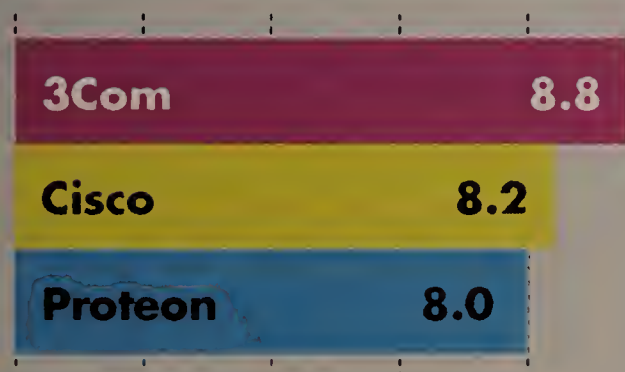
Supra Server comes with its own set of network services to support client/server communications. However, users can also access Supra Server via TechGnosis, Inc.'s SequeLink SQL data access software and, in the near future, through Information Builders, Inc.'s Enterprise Data Access/SQL product. Supra Server also supports Microsoft Corp.'s Open Database Connection and IBM's Distributed Relational Database Architecture.

In addition, Supra Server supports Cincom's Third Party Tool Kit, which enables users to integrate Supra Server with a host of front-end development tools, including Blyth Software, Inc.'s Omnis 7, Pilot Software, Inc.'s Lightship and Easel Corp.'s Easel.

Supra Server is available now and is priced from \$2,000 to \$150,000. ■

# best internetworking products. never heard of them.

## Performance



The Computerworld survey also rated NETBuilder highest for Performance. In another recent study — this one by Harvard University — NETBuilder II was 60.1% faster than the nearest competitor for FDDI routing.

Most network managers know 3Com for adapters only. That's too bad, because both experts and users say our NETBuilder family of bridge/routers is the best in the business.

Computerworld asked 20 NETBuilder users if they would buy the product again, and 20 out of 20 said yes — an unprecedented customer loyalty of 100%. It's no wonder that last year *Systems Integration* magazine rated NETBuilder one of its "Products of the Year."

3Com internetworking products can make life better on your Ethernet, FDDI or Token Ring network. Just call 1-800-NET-3Com and we'll send you reprints of all the studies.



**Networks That Go the Distance™**



THE OLD AND THE NEW HAVE LONG WORKED TOGETHER  
IN HUMAN COMMUNICATIONS.

FINALLY, IT'S TRUE IN DATA COMMUNICATIONS.



Now there's a way to seamlessly integrate SNA<sup>®</sup> and LAN traffic over a single internetwork – with BBN's new T/10 Integrated Access Device. For the first time, the T/10 offers you the flexibility to consolidate remote traffic, while migrating to whatever network architecture or carrier service you choose for the future.

It offers something else, too – a substantial savings. By eliminating multiple devices and circuits you reduce network costs. And by being able to connect to any type of service, you preserve your investment in existing equipment and applications.

To find out how the T/10 can help your organization make the transition to a single enterprise-wide internetwork, call us for a free copy of "Managing the Internetwork Transition" at 1(800) 765-4441.

**BBN COMMUNICATIONS**  
A Division of Bolt Beranek and Newman Inc.



\*SNA, a registered trademark of International Business Machines Corporation



ATTENDANCE IS LIMITED  
REGISTER TODAY!

REGISTRATION INFORMATION

Confirmation

We will mail you a confirmation notice and complete course location information within 48 hrs of our receipt of your registration.

Seminar Times/Locations

Registration for each seminar will begin at 8:30a.m. on the date of the seminar. The seminar will begin promptly at 9:00a.m. and will end at 5:00p.m. The seminar meeting room will be clearly posted in the hotel lobby. Luncheon room location will be announced at the seminar. The post-seminar reception will run from 5:00p.m. to 6:00p.m.

Team Discount

If three or more registrations are made at the same time for members of the same organization, you may deduct \$50.00 off each registration fee!

Cancellation Policy

If necessary, you may cancel your registration for a full refund up to ten business days prior to the seminar date. After this date, any cancellation will be subject to a \$125 cancellation charge. Any registrant who does not attend a seminar and has not previously cancelled will still be liable for the entire seminar fee. You may make an attendee substitution at any time. In the unlikely event that a seminar date must be cancelled, Network World, Inc. will be liable for refund of the seminar fee only.

Hotel

If you will require hotel accommodations, please call the hotel information number that will be listed on your confirmation form and mention that you will be attending the Network World Seminar.



REGISTRATION 1

Name \_\_\_\_\_

Title \_\_\_\_\_

Company/Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

REGISTRATION 2

Name \_\_\_\_\_

Title \_\_\_\_\_

Company/Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

(Please photocopy additional registration forms as needed)

CONVENIENT SEMINAR LOCATIONS (please check one)

- ☐ 11/18/92..... Boston, MA
- ☐ 11/20/92..... New York, NY
- ☐ 12/4/92 ..... Chicago, IL
- ☐ 1/20/93 ..... Washington, DC
- ☐ 2/8/93..... Los Angeles, CA
- ☐ 2/9/93..... San Francisco, CA
- ☐ 3/8/93..... Atlanta, GA
- ☐ 3/22/93 ..... Dallas, TX

METHOD OF PAYMENT

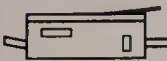
**Course Fee**  
\$350.00 per person includes seminar/workshop, course materials, luncheon, morning and afternoon refreshments and post-seminar reception.

# of Registrants \_\_\_\_\_ x \$350.00 =  
\$ \_\_\_\_\_ Total Fee

3 Easy Ways To Register!



**Phone . . .** Our toll free registration line at **800-643-4668**  
(9:00a.m.-5:30p.m. E.S.T.)



**Fax . . .** this form to 508-879-3167  
(24 hours a day)



**Mail . . .** this form to  
**Network World**  
Special Projects Department  
161 Worcester Road  
Framingham, MA 01701-9172

☐ Check Enclosed  
(Check payable to Network World, Inc.)

☐ Invoice My Company  
P.O. Number \_\_\_\_\_

☐ Bill My Credit Card  
☐ Mastercard  
☐ Visa  
☐ American Express

Account Number \_\_\_\_\_

Expiration Date \_\_\_\_\_

Name on Card \_\_\_\_\_

Signature \_\_\_\_\_



THE OLD AND THE NEW HAVE LONG WORKED TOGETHER  
IN HUMAN COMMUNICATIONS.

FINALLY, IT'S TRUE IN DATA COMMUNICATIONS.



Now there's a way to seamlessly integrate SNA® and LAN traffic over a single internetwork – with BBN's new T/10 Integrated Access Device. For the first time, the T/10 offers you the flexibility to consolidate remote traffic, while migrating to whatever network architecture or carrier service you choose for the future.

It offers something else, too – a substantial savings. By eliminating multiple devices and circuits you reduce network costs. And by being able to connect to any type of service, you preserve your investment in existing equipment and applications.

To find out how the T/10 can help your organization make the transition to a single enterprise-wide internetwork, call us for a free copy of "Managing the Internetwork Transition" at 1(800) 765-4441.



SNA is a registered trademark of International Business Machines Corporation

**BBN COMMUNICATIONS**  
A Division of Bolt Beranek and Newman Inc.



See us at Interop Fall '92



# NETWORK WORLD TECHNICAL SEMINARS

## LAN SECURITY SEMINAR

Keeping up with changes and advances in network technology and how they affect your organization is a difficult job. That's why we have launched *Network World Technical Seminars* — to help keep you current on critical networking issues in a convenient and high quality forum. These one-day, intensive seminars will give you new knowledge, ideas and tools to help make you and your networks more effective.

### LAN SECURITY

Local area networks (LANs) and the information they manage are a key asset and a competitive advantage in every company today. And securing these networks has become increasingly more difficult as more and more end users have access to corporatewide and departmental data. Are your networks open to threats from hackers, viruses, thieves or the forces of nature?

### Attending this Seminar will help you ...

- Understand the scope of the LAN security problem
- Assess your network's areas of greatest liability
- Identify gaps in your network security
- Determine steps to overcome security gaps
- Prevent PC security problems
- Understand network operating system security
- Develop a security policy for your individual network environment

*(See detailed outline on inside cover!)*

*Network World Technical Seminars make it easy for you to attend and learn.*

- One day intensive course minimizes time out of the office
- Eight seminar dates and locations minimize travel costs
- Highest quality expert speakers — LAN Security is presented by Dr. David Stang of the International Computer Security Association (ICSA)
- Luncheon and post-seminar reception provide you with excellent opportunities to network with your peers
- Interactive format and comprehensive seminar handbook give you information and ideas you can implement right away

### DATES AND LOCATIONS

11/18/92 .... Boston, MA  
11/20/92..... New York, NY  
12/4/92 ..... Chicago, IL  
1/20/93 ..... Washington, D.C.  
2/8/93 ..... Los Angeles, CA  
2/9/93 ..... San Francisco, CA  
3/8/93 ..... Atlanta, GA  
3/22/93 ..... Dallas, TX

Presented in  
Cooperation with



**REGISTER TODAY FOR THE SEMINAR  
NEAREST YOU!**

**CALL 800-643-4668**

or complete and fax the registration  
form on the inside back cover to

**FAX 508-879-3167**



# SEMINAR OUTLINE

## LAN SECURITY

Our LANs and the information they manage are frequently under attack from employees, hackers, viruses and thieves, not to mention the forces of nature, including power failures, fires and floods. We'll examine the nature and extent of security breaches and network theft. In addition, we'll explore other factors which corrupt security, including unintentional security threats caused by improper network procedures. Learn the truth behind the "common myths" of network security.

- Threats to LAN security: how extensive is the problem?
- What factors are fueling the security problem?
- The players
- Unveiling common myths

## ASSESSING THE RISKS

Where is your network most vulnerable to attack? We'll use several approaches to assess your network's areas of greatest liability. We'll then determine the steps that you'll need to take to effectively overcome the gaps in your network security.

- How to assess your risks
  - EDP audits
  - Risk assessment
  - Security assessments
- Network security checklists
- Risk assessment strategies

## NETWORK OPERATING SYSTEMS SECURITY

In this section, we'll compare a half-dozen popular network operating systems (NOSs), with emphasis on their security strengths and weaknesses. Find out what characteristics you should look for when considering a NOS. We'll provide you

with specific guidelines for securing a NetWare® network as well as methods for improving the security of Unix systems.

- Network statistics
- A look at specific products
- Product comparisons of security features
- Securing NetWare® networks
  - Security characteristics
  - Security in the boot sequence
  - Creating a secure NetWare® network

## PREVENTING PC SECURITY PROBLEMS

Securing a PC is more difficult than securing a terminal because a microcomputer provides a vehicle to remove information from the network, and its inherent value makes it more vulnerable to theft. We'll give you step-by-step guidelines for making PCs less vulnerable as well as preventing viruses from infecting the PC environment.

- Building your own diskless PC
- Eliminating boot viruses
- Physically securing the PC

## CONTROLLING ACCESS

One of the best ways to secure a network is through access control. We'll examine available hardware and software options that provide effective control of remote user access to the network.

- Software-based access control
- Hardware-based access control
- Reducing the need for access
- Preventing hackers
- Controlling remote access
  - Evaluating access control products

## FACT V. FICTION: VIRUS DANGERS TO NETWARE® LANs

Much of what you've learned about computer viruses, how they infect networks, and how to best defend a LAN are simply false. Some are silly, some are dangerous. We will explore the truth, and demonstrate how viruses work (or don't work) in NetWare®. We will demonstrate what methods of protecting the LAN are effective, and look at some of the approaches that simply don't work at all.

- What common viruses do in NetWare®
- Attacks from the server
- Protecting the server with NetWare®
- Protecting the server with add-on anti-virus products
- Detection, recovery, and disaster planning

## AUTHENTICATION, ENCRYPTION, TRANSMISSION PROTECTION

Find out how to effectively manage passwords and handle associated encryption and authentication procedures. We'll explore different encryption techniques including DES and private key approaches, RSA and public key cryptosystems. We'll also give you "inside tips" on how you can reduce risk and minimize encryption problems.

- Password problems
- Personal attributes as identifiers
- Guidelines for password management
- How encryption works
- DES, RSA, and other approaches
- Message authentication and digital signatures
- Protecting network transmission

## FAULT TOLERANCE

Learn how you can build fault tolerance into your system with a very modest investment. Certain network operating systems offer more fault tolerance capability than others. We'll explore NOS fault tolerance, and examine software that will help you recover from and prevent future disaster.

- Fault-tolerant users
- Hardware and fault tolerance
- Fault-tolerant storage
- Fault tolerance and network operating systems
  - Data protection features
  - Tools for preventing LAN hardware disasters
  - Tools for recovering from LAN disasters

## MODEL POLICY

We'll develop a model policy that you can adapt for use back at the office. Through interactive group exercises, we'll develop a policy specific to the participants' individual network environments.

- Parts and pieces of the model policy
- Implementation strategies
- Participants' suggestions

## ABOUT THE PRESENTER

Dr. David Stang has been teaching network security seminars for over three years in the U.S. and Europe. As Director of Research for the International Computer Security Association, he has written several books on the topic, including *LAN Security*, *Microcomputer Security*, and *Defending Corporate Information*. Before his present position, Dr. Stang was founder and Director of Research for the National Computer Security Association.